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EVALUATION OF THE AECB'S PROCESS OF CONSULTATION WITH EMPLOYEES OF ITS LICENSEES

by

Beak Consultants Limited

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Report

PROJECT TEAM AND ACKNOWLEDGEMENTS

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ABSTRACT

During the development of new and amended regulations for the control of the nuclear industry in Canada, the Atomic Energy Control Board (AECB) has involved a number of public consultation approaches aimed at keeping the public informed about these regulatory changes as well as receiving public feedback on any recommendations or concerns relating to them. As part of a program to evaluate their public consultation, AECB has retained Beak Consultants Limited (BEAK) to investigate the effectiveness of these programs relative to workers at AECB licensed facilities.

The first stage in the study involved a review of public consultation methods used by various Federal Government agencies. These were then compared to the existing AECB programs to evaluate potential improvements. These were also referred to in later surveys of employees at licensed facilities to determine their perceived appropriateness.

For survey purposes, the AECB licensed facilities were divided into 12 classes of radioisotope licence, power or research reactor licences, uranium mine/mill licences, heavy water plant licences, radioactive waste management licences and accelerator licences. A telephone survey of facility management was used to determine the distribution of radiation workers by licence type and the management opinions of worker awareness of AECB. Union or professional association representatives were also surveyed by telephone. During these telephone discussions, arrangements were made to coordinate an in-person survey of employees at representative facilities.

A detailed questionnaire was designed for use in the survey of employees. The questionnaire was then pretested at the University of Toronto. This resulted in revisions to questions found to be ambiguous or difficult to understand as well as shortening the questionnaire to speed up the response time. The questionnaire was then reviewed and revised by the AECB. Some revisions were also made, at a later time, as a condition imposed by management at some licensed facilities.

Initial telephone surveys indicated that Ontario had the most complete representation of the various licence categories so, for cost-effectiveness, the detailed questionnaire was primarily used in this province. In addition, employee surveys were conducted of uranium miners in Saskatchewan and reactor workers in New Brunswick. Reactors in Quebec and uranium mining companies in Ontario declined the invitation to participate. A total of 543 questionnaires were administered to employees at 25 different facilities.

The majority of employees were both aware of AECB and correctly understood its function. Both of these aspects increased as a function of union membership, age, income, male sex and ARW status. However, the use of AECB consultative documents declined with union membership and increased with membership in professional associations. Satisfaction with the AECB consultative process was fairly low. Workers tended to be more satisfied with other agencies or safety associations. Feelings of job safety were greatest among those who received consultative documents or read AECB press releases.

Feelings of safety also increased with age, education, income and professional association membership, but declined with union membership. Unionized employees expressed a desire for more consultation with AECB.

The study resulted in a number of recommendations to improve the AECB process of consultation with employees at licensed facilities. These included:

(a) more emphasis on direct two-way communication through regional workshops or meetings at individual facilities;

(b) distribution of non-technical summaries of consultative documents;

(c) expanded distribution of Notices of Issuance with the opportunity to request more in-depth consultative documents or lay summaries. Employers, unions, professional associations and the media could be asked to help inform employees of the availability of these documents;

(d) response questionnaire mail-back forms should be enclosed with consultative documents, and analysis reports should be enclosed with final regulatory documents summarizing these responses;

(e) a non-technical regulatory journal or newsletter should be issued on a regular basis to keep management informed about the status of proposed amendments;

(f) input to special information programs for non-technical, non-radiation workers at licensed facilities; and

(g) input to formal training programs on radiation protection available to radiation workers at licensed facilities.

While recommendations (f) and (g) are not directly related to the consultation process, and may be considered the employer's responsibility, AECB participation in employee programs would improve the climate for consultation with employees.

Additional recommendations related to improved targeting of consultation with employees included:

(a) more specific guidelines for designation of ARW's by employers, and
(b) updating of licensee contacts for each licence held.

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RÉSUMÉ

Durant le développement de règlements nouveaux ou modifiés pour la réglementation de l'industrie nucléaire au Canada, la Commission de contrôle de l'énergie atomique (CCEA) a entrepris différentes formes de consultation publique afin de tenir le public au courant de tout changement apporté à la réglementation et de connaître ses réactions face à toute recommandation qui s'y rapporte. Dans le cadre de l'évaluation de son processus de consultation publique, la CCEA a retenu BEAK Consultants (BEAK) pour examiner l'efficacité de ces différentes formes de consultation du point de vue des travailleurs.

La première phase de l'étude comprenait l'examen des méthodes de consultation publique utilisées par divers organismes du gouvernement fédéral. Les méthodes ont été comparées par la suite aux programmes existants de la CCEA en vue d'évaluer les améliorations possibles. Elles ont aussi été mentionnées au cours d'enquêtes ultérieures dans les installations autorisées afin de déterminer si les employés les jugeaient opportunes.

Aux fins de ces enquêtes, les installations autorisées par la CCEA ont été divisées en 12 catégories de permis d'après la classification suivante : radioisotopes, réacteurs de puissance et de recherche, mines et usines de concentration d'uranium, usines d'eau lourde, gestion des déchets radioactifs et accélérateurs. On a effectué une enquête par téléphone auprès de la direction des installations afin de déterminer la distribution des travailleurs sous rayonnements par catégorie de permis et l'opinion de la direction sur la connaissance que les employés ont de la CCEA. Les représentants des syndicats et des associations professionnelles ont aussi été interrogés par téléphone. Pendant ces discussions téléphoniques, des dispositions ont été prises pour coordonner une enquête personnelle sur place auprès des employés d'installations représentatives.

Un questionnaire détaillé a été établi pour les enquêtes auprès des employés. Le questionnaire a été éprouvé à l'Université de Toronto. Par la suite, des révisions aux questions paraissant ambiguës ou difficiles à comprendre ont été apportées, et le questionnaire a été écourté afin d'accélérer le délai de réponse. Le questionnaire a été ensuite revu et corrigé par la CCEA. Quelques révisions ont été apportées un peu plus tard à la demande de la direction de quelques installations autorisées.

Comme les premières enquêtes par téléphone ont indiqué que l'Ontario comptait la meilleure représentation au sein des diverses catégories, le questionnaire détaillé a été utilisé principalement dans cette province pour des questions de rentabilité. De plus, des enquêtes ont été menées auprès des mineurs d'uranium de la Saskatchewan et des employés de réacteur du Nouveau-Brunswick. Les réacteurs du Québec et les sociétés minières de l'Ontario ont décliné l'invitation à participer. Cinq cent quarante-trois (543) questionnaires ont été remis aux employés de 25 installations.

La plupart des employés étaient à la fois conscients de l'existence de la CCEA et comprenaient correctement son rôle. Ces deux aspects augmentent en fonction des facteurs suivants : l'affiliation syndicale, l'âge, le revenu, le sexe masculin et le statut de travailleur sous rayonnement de l'employé. Toutefois, le recours aux documents de consultation de la CCEA décroît en proportion de l'affiliation syndicale et augmente en proportion de l'accréditation par des associations professionnelles. Les employés se sont montrés assez peu satisfaits en général du processus de consultation de la CCEA, tandis qu'ils semblaient être plus satisfaits des autres organismes ou associations de sécurité. Le sentiment de sécurité au travail était le plus fort chez ceux qui reçoivent les documents de consultation de la CCEA ou qui lisent ses communiqués de presse.

Le sentiment de sécurité s'accroît aussi en fonction des facteurs suivants : l'âge, l'éducation, le revenu, l'affiliation professionnelle, mais décroît en fonction de l'affiliation syndicale. Les employés syndiqués ont exprimé le désir d'une plus grande consultation de la part de la CCEA.

L'étude présente les recommandations suivantes pour améliorer le processus de consultation de la CCEA auprès des employés des installations autorisées :

a) une plus grande insistance sur la communication réciproque directe grâce à des ateliers régionaux ou réunions dans les installations elles-mêmes;

b) la distribution de résumés non techniques des documents de consultation.

c) la distribution accrue d'avis de publication et l'occasion de demande des documents de consultation plus approfondis ou des résumés de vulgarisation. On pourrait demander aux employeurs, aux syndicats, aux associations professionnelles et aux médias d'aider à mieux renseigner les employés sur la disponibilité de tels documents;

d) la distribution d'un questionnaire-réponse, comme pièce jointe, avec chaque document de consultation et la distribution du rapport d'analyse de ces questionnaires, comme pièce jointe, avec la version définitive des documents de réglementation;

e) la publication périodique d'un journal ou d'un bulletin non technique pour informer la direction de l'état des modifications proposées à la réglementation;

f) la participation à des programmes d'information spéciaux dans les installations autorisées à l'intention des travailleurs qui ne sont ni travailleurs techniques ni travailleurs sous rayonnements;

g) la participation à des programmes de formation officiels en radioprotection dans les installations autorisées à l'intention des travailleurs sous rayonnements;

Bien que les recommandations f) et g) ne soient pas directement liées au processus de consultation et peuvent être considérées comme responsabilités relevant de l'employeur, la participation de la CCEA dans les programmes pour employés améliorerait le climat de la consultation auprès d'eux.

D'autres recommandations liées à une meilleure orientation de la consultation auprès des employés comprennent :

a) des lignes directices plus précises pour la désignation des travailleurs sous rayonnements par les employeurs;

b) la mise à jour du nom des personnes contacts chez les titulaires de permis pour chaque permis détenu.

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1. INTRODUCTION

1.1 Background

The AECB has the mandate to regulate the development and operation of nuclear facilities in Canada and to control related prescribed substances. Part of this mandate involves the development of new and amended regulations to safeguard the nuclear industry, its employees and the general environment. In the development of such regulations, the AECB has involved public consultation and information processes. The purposes of public consultation include:

(a) keeping the public informed on AECB and how it regulates the nuclear industry;

(b) informing AECB of any public concerns or suggestions related to this regulation; and

(c) optimizing the development of new and amended regulations through informed public review and feedback.

The AECB is interested in the effectiveness of its public consultation programs. Its interest is both in the usefulness of these programs to the general public and as a mechanism for keeping employees and management at licensed facilities involved and informed on the regulatory process. A study was recently concluded (Secor, 1984; AECB Report INFO-0123) to analyze the AECB public consultation program in general. This study looked primarily at the use of Consultative Documents. It also reviewed consultative programs initiated by other federal agencies such as CRTC, CTC and NEB. It concluded that the existing AECB public consultative process "appears quite satisfactory" as it applies to the nuclear industry. However, it was noted that public response is relatively low (averaging 6% response on mailed Consultative Documents). It was also noted that the program has not been so successful relative to unions and professional associations at licensed facilities, local communities near these facilities and public interest groups.

The Canadian Labour Congress (CLC) has encouraged AECB over the past several years to conduct an evaluation of its consultation programs with specific reference to workers. The present study was undertaken to investigate the effectiveness of these programs relative to workers at facilities licensed by AECB.

1.2 Objectives

The objectives of this study were:

(a) to determine the extent to which employees of AECB facilities wish to be consulted in the regulatory process;

(b) to determine the usefulness of existing AECB public consultation programs in keeping licensee employees informed; and

(c) to determine the optimal approaches for including consultation with licensee employees in the regulatory process.

2. IDENTIFICATION OF PUBLIC CONSULTATION APPROACHES

Public consultation has become increasingly important in Canadian decision-making over the last two decades (Burton and Wildgoose, 1977; Sadler, 1979). However, it still remains a poorly understood and often ineffective tool that requires considerable research to optimize approaches under different objectives and background circumstances. A wide variety of public consultation approaches has been used in Canada. These are listed by Eedy and Howes (1982) to include: disclosure meetings to inform the public at early stages in planning; news releases or advertisements; information meetings at critical stages in project development; workshops to work together with the public on defining or resolving issues; open houses; newsletters; questionnaires; public advisory committees; random interviews or opinion surveys; institutional interviews; public reports; and formal public hearings.

Eedy and Howes (1982) note that the different methods have widely varying effects and are most appropriate under different background circumstances or even at different times under the same project development. In fact, in some of their case studies, as many as 11 of these 12 different methods were applied to the same study within a relatively short period of time. During the current study, a number of additional methods were also identified that were more appropriate to long-term, more general issue information programs.

The variation in optimal approaches to public information is further emphasized by Sully et al. (1982) who summarize how the same combination of most of the above methods applied at two different locations at the same time and relating to the same development resulted in totally opposite results. The importance of implementing a good public consultation program was pointed out by Eedy (1982) who reviewed a totally subsidized project with obvious local benefits that was turned down due to public concerns that were raised in the early stages of public consultation and not properly responded to.

The purpose of public consultation on regulatory agenda is to ensure that the most effective regulations are developed. Public involvement in their development not only allows public input to the optimization of the regulations, but it also maximizes public acceptance of these regulations once enacted. It is thus imperative that AECB utilizes the best approaches to maximize the effectiveness of public consultation in its regulatory process.

2.1 Approaches Used by Other Regulatory Agencies

In order to investigate the variety of methods used in public consultation and to recommend optimal approaches for AECB's regulatory agenda, a review was conducted of the public consultation approaches found most effective by other government agencies. These were compared to the approaches currently used by AECB.

Regulations to be proclaimed in Canada must first undergo an analysis of their costs and benefits which includes consultation with directly affected parties both at the problem definition stage and at the proposed regulation stage (Treasury Board of Canada, 1979). The public ("all interested parties") must be given a minimum of 60 days to review and comment on a proposed regulation, its purpose, its legal authority, and a summary of its socio-economic impacts. Due to this requirement, different regulatory agencies have designed a variety of approaches to involve the public in review of regulatory agenda.

Public consultation programs used in regulation development by Federal agencies include:

(a) **Environment Canada** (1980) issued a draft policy for public consultation which was distributed for public input. They have also had annual public meetings to review the effectiveness of their public information policies.

Most of public information on new regulatory agenda is handled through Ottawa. Each regulation has a specified information officer. The department issues a handbook for these officers telling them how to respond to public enquiries. Regulatory agenda and background reports on the need for new regulations are all public. Environment Canada is currently having an outside evaluation of this program.

In addition to the regulatory agenda, Environment Canada has information officers in each region, a regular newsletter, an open policy on public availability of reports, and annual public workshops in each region to discuss departmental policy.

(b) **Labour Canada** issues regulatory agendas to the public with names of departmental contacts for specific regulations. Meetings are held with employer groups to discuss these regulatory agendas. Those contacted did not know a lot about the implementation of these public consultation approaches, since programs are apparently regulation-specific.

(c) The **Canadian Transport Commission** publishes notices regarding new regulations in the Canada Gazette. Media releases and local press advertisements are used in the area affected. If enough public comments occur, a quasi-judicial hearing is set up.

(d) **Health and Welfare Canada** issues information letters to some of the Department's 10,000 person mailing list (only those on list affected by specific regulations). A ninety-day response period is allowed for comments. If major revisions occur, a second draft of the first letter goes out for comments. A second letter summarizes comments and final regulatory decisions. Responses to the letter are low, with a 2% response rate considered good. If response is felt inadequate, follow-up calls are used quite successfully.

The Department publishes regulatory agendas and notices in the Canada Gazette and occasionally uses advertisements or press releases in special cases. An information service hot line at five Regional and 22 District offices as well as in Ottawa is used. An Expert Advisory Committee (technical, consumer and industry representatives) which meets two to three times per year has been created. Occasionally, Health & Welfare Canada holds Regional meetings, by invitation only, asking for a broad spectrum of opinions. Moreover, the Department occasionally participates in association meetings or seminars.

(e) The **National Energy Board** publishes regulatory agenda, information bulletins and newspaper notices. All applications must go to public hearings. If these hearings result in proposed regulatory or policy changes, separate hearings are held. The National Energy Board publishes hearings decisions, legal transcripts, etc. For minor regulatory changes, they send a draft to a mailing list (different list for each energy sector), but seldom get much response. (A recent draft went to 1,000 with 35 responses.)

(f) The **Canadian Radio and Telecommunications Commission** issues the notices of proposed regulatory changes to a mailing list and to the media. Responses vary from few to thousands. When public hearings are called, media releases as well as advertisements are used. Hearings are formal and legal. All documents used at hearings are public.

(g) The **Transport Canada** Information Officer contacted knew of no public consultation activities outside of the Transportation of Dangerous Goods (TDG)

Regulations. Transport Canada does issue twice annual regulatory agenda to subscribers. This regulatory agenda lists regulatory activities proposed and contacts. In proclaiming the TDG Regulations, an extensive public consultation program was conducted. This included public availability of draft regulations and a comment period, a monthly TDG Newsletter to keep the public informed on status of the regulations, TDG Special Bulletins at milestones in the regulatory agenda, and irregular Information Bulletins and Occurrence Reports to discuss special aspects of the TDG Regulations. Special information telephone contacts were also available throughout.

2.2 The AECB Consultation Process

The AECB currently employs a number of public consultation approaches. These include:

(a) **Regulatory Agendas** are issued to those requesting to be on the mailing list on a twice annual basis. They list all proposed regulatory changes, the rationale for investigating the changes, the status of implementation and studies planned or in progress relevant to the proposed regulation. They also provide a contact name at AECB for further information.

(b) **Consultative Documents** are prepared for each specific regulatory change proposed, for new regulatory guidelines or regulatory policy statements, and for new generic licence conditions. This summarizes the proposed amendment or new regulation and solicits public comment. The consultative documents are automatically sent to a general mailing list and to an ad hoc mailing list of persons who have expressed interest in the specific area of regulation. Notices of Issuance are sent to a further supplementary general list. The full document is forwarded to persons on that list upon request. Media releases are also used to inform the public of the availability of documents judged to have a significant impact or to merit promotion.

A period of 90 days is allowed for public input to the proposed regulation. If comments result in significant revisions to the proposed legislation, a second draft may be circulated to those in the public who commented on the first draft.

An Analysis Report summarizing the consultation process, the comments received and their impact on the final regulations, is sometimes distributed with the final regulatory document.

(c) The **AECB Library** and Public Documents Room at 270 Albert Street in Ottawa is open to the public. All public reports and documents by or submitted to the AECB are available. Librarians are also available to direct public users or respond to questions.

(d) The **Office of Public Information** has full-time information officers available to respond to public inquiries. It also issues periodic public summaries of AECB regulations, policies and studies in the Regulatory Agenda (a), publishes and distributes the Consultative Documents (b), and issues the Annual Publications Catalogue (e), other periodic documents (f) and media releases (g).

(e) Several **Annual Reports** issued by AECB are available to the public. The Annual Publications Catalogue lists reports and documents available to the public. The AECB Annual Report summarizes activities and budgets for the past year. It includes information on existing and future regulatory changes.

(f) **Periodic Documents** are published by the AECB on its research, regulations and policies.

(g) **Media Releases** are issued on research, policies, regulations and other AECB actions when public interest is felt to warrant these.

(h) **Inspectors:** Nuclear facilities licensed under AECB regulation are periodically inspected by AECB personnel. These inspectors are available to report to the management and employees on the reasons for inspection, outcome of the inspection and general AECB policies or regulations relative to that facility. They are also available to respond to management or employee inquiries related to the facilities.

(i) **Seminars:** Senior AECB staff attend and give policy papers at selected conferences and seminars. Recent papers have been given on the consultation program as it relates to regulatory initiatives. Also, the Uranium Mines Division participates in two seminar training courses each year, dealing with radiation safety and regulatory policy.

2.3 Summary and Comparison of Regulatory Public Participation

All Federal departments with regulatory mandates include a number of common public consultation approaches. These include the Canada Gazette, twice annual publishing of regulatory agenda, information officers, and consultative documents or draft regulations being sent for a public review period of 90 days. Within these basic approaches, the application varies greatly. Environment Canada has perhaps the most consistent and widespread approach. Hence, all draft regulations, background study documents, etc. are sent for public review; regular newsletters and technical publications keep the public informed as new regulations are slowly developed; and annual public workshops provide feedback on how the public consultation is working. Transport Canada had a similar program for its new Transportation of Dangerous Goods Regulations, but other regulations are treated with a much lower profile. Other regulatory agencies such as NEB and CRTC have a much more formal program with legalized public hearings and active involvement of special interest groups on a regulation-specific basis.

The AECB public consultation program was felt to compare well with other Federal agencies. The mechanisms are available. The main concerns are whether these are known and used by the appropriate public groups, whether these groups understand the information in the highly technical documents available, how to keep the interested public informed on the status and revisions of regulations as they undergo lengthy reviews, and how to ensure that while information is available to all the public, only those specifically interested in a topic area receive the detailed documentation.

The AECB uses Notices of Issuance to answer, at least partially, the last area of concern. These Notices of Issuance could potentially be expanded in distribution while cutting back on distribution of more lengthy or technical documents until specifically requested. A periodic survey of public concerns and desires, such as conducted by Environment Canada, could also be of great value. Other examples recommended for AECB consideration include:

(a) The **EPS Environmental Quality Update** provides a status report summary. This identifies all regulations for which changes are considered and the status of related reports. It is up to the individuals on the mailing list to obtain the relevant documents and background reports.

This would solve problems identified in our survey such as: receipt of non-relevant regulatory documentation; lack of follow-up material on finalization of regulatory

changes; clarification of status of proposed regulatory changes; identification of authorities to contact with specific regulatory change questions; and desires of some employers only to obtain information once changes have been finalized.

(b) The **EPS Summary Report** is one of four milestone technical reports (or series of reports) required by EPS to rationalize proposed regulation changes. A summary report is sent to all who commented on the technical reports or consultative documents. It provides a less technical (layman) summary of all documents, comments and the final resolution. The **Analysis Report** which is sometimes issued by AECB with a regulatory document serves much the same function. Expanded use of the Analysis Report would resolve a number of licensee comments such as: "we are only interested in the final result", "consultative documents are too technical to understand", and "we need some indication of how public comments are responded to".

(c) The **TDG Newsletter** is a monthly, widely distributed summary of all events relevant to regulatory agenda under the TDG Act. It is thus similar to the EPS "Update" and "Summary" combined. It also announces other types of available "awareness materials", summarizes events, and gives examples of responses to events.

(d) **TDG Special Bulletins** come out irregularly but consistently. They are a low cost way of keeping everyone up-to-date.

(e) **TDG Information Bulletin and Occurrence Reports** are irregular but provide the kind of lay summaries people seem to want. The occurrence report emphasizes the need for specific regulations.

3. THE AECB LICENSING SYSTEM

The AECB issues licences to radionuclide users in a number of different categories. Licence conditions may be stipulated according to the licence type, the intended radionuclide use, and the facilities available to the licensee. One requirement is the designation of certain employees as Atomic Radiation Workers (ARW's) if there is a reasonable probability during the dosimetry year that they will exceed the 500 mrem (5 mSv) stochastic dose commitment limit set by the regulation for non-ARW's. Designated ARW's must be monitored by the use of personal dosimeters. Designation of ARW's is the responsibility of the employer.

Licences are grouped into eight broad categories, including: 34 Prescribed Substances Licences, 5,217 Radioisotope Licences, 21 Power and Research Reactor Licences, 21 Uranium Mine/Mill Licences, 8 Uranium Refinery and Fuel Fabrication Licences, 5 Heavy Water Plant Licences, 11 Radioactive Waste Management Licences, and 57 Accelerator Licences, including licences for construction, decommissioning and "mothballed" facilities.

3.1 Prescribed Substances Licences

Prescribed substances licensees possess radioactive materials which are subject to international safeguards obligations, typically uranium and thorium compounds, usually of low activity but often in large quantities. Possession may be for the purpose of resale, display, storage or analysis. The functions of the prescribed substances licensing program include inventory and transportation safeguards. Radiological risk to employees is generally considered to be minor. Consequently, the present study did not consider employees of prescribed substances licence holders.

3.2 Radioisotope Licences

Radioisotope licences are further classified into 23 categories, as follows:

(a) **Analyzers (ANALYZ):** This category is used for instruments which may be portable but usually are fixed laboratory instruments. The sources are small.

(b) **Brachytherapy (BRATPY):** These sources are used for cancer therapy by implanting them into or close to the tumor. Typical sources are approximately 1 GBq (gigabecquerel) of cesium-137, iodine-125, gold-198, iridium-192 or radium-226.

(c) **Calibration (CALIBR):** These sources, which are normally used for instrument calibration, can vary from several kilobecquerels to a gigabecquerel. Small sources would normally be stored or shipped in a lead container. Larger sources are located behind massive shields.

(d) **Consolidated (CONSLD):** For large institutions such as some universities, consolidated licences are issued which allow the institution some control in the purchasing and use of radioactive material. This category encompasses all the other use types.

(e) **Gas Chromatographs (CROMAT):** Gas chromatographs are laboratory instruments which sometimes use small tritium or nickel-63 sources to detect trace amounts of certain compounds in gases. The sources are marked with a radiation warning sign and are located inside the instrument.

(f) **Dewpointer (DEWPTR):** Dewpointers, which contain small radium-226 sources, are used to measure the dewpoint of gases.

(g) **Gauges:** Fixed gauges are normally mounted on pipes or tanks in factories to measure remotely the density, moisture or level of the product. They usually contain between 1 and 100 gigabecquerels of cesium-137 inside a lead shield which is marked with a radiation warning sign.

(h) **Human In Vitro (HUMVIT):** Small amounts of radioactive material are used in laboratory tests to aid in the diagnosis of human diseases.

(i) **Human In Vivo (HUMVIV):** Small amounts of radioactive material with short half-lives are injected into humans as part of certain diagnostic tests but, in some cases such as hyperthyroidism, iodine-131 in solution is injected for therapy purposes.

(j) **Irradiator (IRADTR):** By using radiation, certain products can be sterilized or changed chemically. For example, large doses are used to sterilize medical products such as sutures, and smaller doses can be used to delay the spoilage of fruits and

vegetables. Irradiators can vary from a few terabecquerels of cobalt-60 or cesium-137 inside a lead shield, to petabecquerels of cobalt-60 which are stored underwater and raised inside a shielded room to irradiate the product. The room contains numerous interlocks on all entrances, warning signs and thick concrete walls. In case of fire within the shielded room, it is necessary to shield the source before entering. If this is not possible, the fire must be fought externally.

(k) **Logging (LOGING):** Sealed sources of cesium-137 and americium-241 are frequently lowered down oil and gas wells to obtain information about the formations surrounding the well. Sources as large as a terabecquerel are used. Sources are normally stored in pipes or pits in the ground, and they are transported to the well head in sturdy shields which have passed severe drop, puncture and fire tests.

(l) **Light Source (LT SCE):** Radioactive material can be used to cause fluorescence of certain materials. The most common use is emergency exit signs on aircraft which contain approximately one-half terabecquerel of tritium gas (a radioactive form of hydrogen). The containers are robust to prevent breakage of the glass tubes which contain the tritium gas.

(m) **Open Source (OP SCE):** Unsealed radioactive material is used for a variety of experiments and tests. The material is normally received from the supplier in glass vials and, for use, the contents are withdrawn and used in a typical chemical laboratory. If there is a possibility of airborne radioactive material, fume hoods are used. If a significant amount of activity is spread around the laboratory, precautions must be taken to prevent ingestion or contamination of the skin or clothing. Each laboratory using radioactive material is identified with a warning sign and the name and telephone number of a person to contact in the case of emergencies.

(n) **Other:** This category is used to describe a few uses which do not conveniently fit into any of the other categories.

(o) **Nuclear Pacemaker (PACER):** Radioactive material is used to provide the power for some cardiac pacemakers. There are approximately 50 people in Canada who have these, but the number is gradually decreasing because improved batteries have been replacing radioactive power sources in any new implants. The containers have been designed to withstand cremation and severe impacts. Each patient carries a card or wears a bracelet to alert people.

(p) **Portable Gauges (PORGAG):** Portable instruments which contain 400 megabecquerels of cesium-137 and 2 gigabecquerels of americium-241 are commonly used to measure the moisture and density of soils, road beds, etc. These units are normally of little hazard. However, the instruments are sometimes damaged by earth-moving equipment. In such cases, the sources may be separated from the debris, and it is important to determine their location.

(q) **Radiography (RADGFY):** Cobalt-60 and iridium-192 as large as 2 terabecquerels are regularly used to radiograph welds, castings, etc. The sources are taken to job sites in portable "cameras" which typically weigh about 20 kg. These sources are extremely dangerous when they are unshielded. Because of the potential hazard, they can only be used by certified radiographers who have studied radiation safety, and each camera must be able to withstand severe fire, impact and puncture tests. Cameras are durably marked with a radiation warning sign and the owner's name and telephone number.

(r) **Smoke Detectors (SMOKE):** Radioactive material (americium-241) is commonly used to detect the early stages of a fire and, in many cities, such a unit is mandatory in each house.

(s) **Static Eliminators (STALIM):** Polonium-210 mounted in strips, brushes or air nozzles is a common method to reduce static electricity problems, such as those in the printing and photofinishing industry. The radioactive material is contained within small ceramic beads which, in turn, are protected by a screen.

(t) **Supplier (SUPPLR):** This category is used for all companies that supply radioactive material. The products could range from smoke detectors to radiography sources.

(u) **Surge Voltage Protectors (SURPRO):** Small amounts of radioactive material are used in some electronic tubes to provide specific characteristics.

(v) **Target:** Targets for high energy accelerators sometimes contain up to 4 terabecquerels of tritium. The tritium is contained within the target which, in turn, is located inside an accelerator tube. Accelerators of this type are normally located only at some universities.

(w) **Teletherapy (TELTPY):** Cobalt-60 sources as large as 500 terabecquerels are used to treat cancer patients. Sources this large could be very dangerous but, for protection, they are located inside massive lead shields and specially designed rooms. The source can only be exposed when the door to the therapy room is closed and a specific start-up procedure is followed. In view of the massive nature of the lead shield and the thick concrete walls, floor and ceiling, the probability of the source being unshielded as the result of a fire is extremely small.

For the purposes of this study, some licence categories have been pooled, reflecting their similarities in terms of working environment, source strength and potential human hazards. As a result, 12 radioisotope licence categories were considered, as follows: ANALYZ-CROMAT, BRATPY-TELPY, CALIBR, CONSOLD, COMPROD (SMOKE-STALIM-SURPRO-DEWPTR-LT SCE), GAUGES (GAUGES-PORGAG), HUM OPSCE (HUMVIT-HUMVIV-OP SCE), IRADTR, LOGING, RADGFY, SUPPLR and TARGET.

Analyzers and chromatographs containing sealed sources are typically used in analytical chemistry laboratories. Brachytherapy and teletherapy sources are typically used in hospital radiotherapy units. The COMPROD category includes small sealed sources in commercial products for industrial or consumer use. Gauges contain sealed sources, both fixed and portable, and are used in factories and construction, where there is a significant potential for source damage and radioisotope release. The HUM OPSCE category includes various uses of unsealed radioisotopes in solution in medical or other laboratories, where there is a significant potential for accidental dispersion.

Radioisotope licences in PACER and OTHER categories have not been specifically considered in this study. PACER licences are held by individual patients whose names and medical histories are confidential. OTHER licences have been excluded in view of their small number and very diverse nature.

The vast majority of licences issued by AECB are radioisotope licences. As of April 1985, the catalogue included 5,217 radioisotope licences in the categories listed above.

3.3 Power and Research Reactor Licences

Power and research reactors differ in type and capacity. For the purposes of this study, all reactor licences have been grouped together. As of 31 March 1985, there were 12 power reactor licences in Canada, all CANDU-PHW pressurized heavy water reactors, with the exception of a CANDU-BLW boiling light water reactor currently being

decommissioned. The power reactors range in licensed capacity from 25 MW (NDP Generating Station) to 850 MW (Darlington Generating Station A under construction), with up to four reactor units per licence.

There were nine research reactor licences in Canada as of 31 March 1985. Most are for Slowpoke II reactors with a 20 KW licensed capacity. The largest, outside of AECL, is for a 5 MW Swimming Pool reactor at McMaster University.

3.4 Uranium Mine/Mill Licences

Uranium mine/mill licences vary in type and capacity. Underground exploration, ore removal and decommissioning licences do not specify capacity. Production licences specify both product (e.g., mill feed, uranium concentrate, uranium, acid raffinate, ore) and capacity on a per diem or annual basis. As of 31 March 1985, there were 21 uranium mine/mill licences in Canada, including four for exploration, five for ore removal, four for decommissioning and eight for production.

3.5 Uranium Refinery and Fuel Fabrication Licences

Uranium refineries produce elemental uranium or uranium compounds from the mill product. Uranium compounds include UF_6, UO_2, UO_3 and ammonium di-uranate (yellowcake is usually the mill product). Licensed capacities of refineries range from 70 to 18,000 tonnes/yr of specific compounds, with up to four compounds on each licence. Fuel fabricators produce smaller quantities (200 to 600 tonnes/yr) of uranium fuel bundles or pellets from the refinery product for use as a reactor fuel. Both refineries and fuel fabricators hold a Fuel Facility Operating Licence. As of 31 March 1985, there were eight such licences in Canada.

3.6 Heavy Water Plant Licences

Heavy water plant licences range in production capacity from 400 to 800 tonnes/yr of heavy water for use as a reactor coolant. As of 31 March 1985, five heavy water plant licences were held in Canada.

3.7 Radioactive Waste Management Licences

Radioactive waste management facilities vary with type of waste and type of treatment, including storage of high-level solid wastes from nuclear power stations (e.g., spent fuel),

research facilities, uranium refineries and military activities, and storage or incineration of low-level wastes. As of 31 March 1985, there were 11 radioactive waste management licences in Canada.

3.8 Accelerator Licences

Accelerators are used to accelerate sub-atomic particles for various applications. In physic, they are used in the study of sub-atomic particle interactions. In medicine, they are used principally for diagnosis and therapy. Accelerators are typically located in university research laboratories or hospital radiotherapy units. As of March 1985, there were 57 accelerator licences in Canada.

4. DISTRIBUTION OF RADIATION WORKERS AT LICENSED FACILITIES

The distribution of radiation workers, by facility licence type and province, was investigated by means of a telephone survey of facility management. The purpose of this preliminary investigation was to identify any obvious regional differences in radiation worker populations, with respect to type of work performed (i.e., licence category), awareness of the AECB consultation process, or satisfaction with that process. Impressions of employee awareness and satisfaction were assessed indirectly by questioning management personnel, as well as union or other worker representatives where possible (see Section 4.3). Direct surveys of workers are discussed in Section 5. Suggested regional differences in worker populations were considered in determining the geographical scope of the subsequent written questionnaire survey of employees.

Figure 4-1 is a questionnaire used in the management survey to ensure consistency during telephone interviews.

Licensees were contacted during the preliminary survey in all provinces and territories, except the Northwest Territories, where a single contact was attempted but no response obtained. They were selected by stratified random sampling from the AECB catalogue of licensees. Radioisotope licensees and accelerator licensees were determined by province from AECB computer files. Other types of licensees were determined from the AECB Annual Report.

The sampling effort ranged from approximately 1% in well represented province by licence type categories (100 or more licensees) to 100% in some categories represented by a single licensee in the province. There are a large number of province by licence type categories containing a single licensee, or very few licensees. Therefore, equal sampling effort in all categories would not be practical without excluding the majority of province by licence type categories.

Each respondent in the telephone survey (Figure 4-1) was asked to estimate the number of ARW's present at his/her facility and to indicate in general whether those workers were aware of the AECB consultation process and whether they were satisfied with the level of consultation. Details were also sought on worker organizations and the willingness of the licensee to be involved in a survey of individual employees (Section 5). ARW's were defined for the purposes of this survey as workers who either handle radioactive materials or work in designated radiation areas. Designated ARW's were

FIGURE 4-1: FORM USED IN TELEPHONE SURVEY OF LICENSEE MANAGEMENT

AECB PUBLIC CONSULTATION — PHONE SURVEY

LICENSEE or FACILITY: _____

ADDRESS: _____

_____

_____

_____

TELEPHONE: _____

_____

Number of radiation workers: _____
(handle radioisotopes or work in designated radiation areas)

Consultation Process: AECB

Worker Awareness? _____

_____

Worker Satisfaction? _____

_____

Unions represented at the facility: _____
(contacts-shop steward or local pres.) _____

_____

Telephone Number: _____

Professional Affiliations: _____
(if no union)

Contact: _____ Telephone: _____

Willingness to participate in study: yes no maybe
Willingness to set up group survey:
they will do it
let the union do it
Beak to arrange

Comments: _____

_____

_____

_____

Date: _____ Time: _____

included in this enumeration, even though some of them do not handle radioactive materials or work in radiation areas.

4.1 Results of Management Survey

The distribution of licences by province and licence type is shown in Table 4-1. The number of licensees contacted in each province by licence type category during the telephone survey is included in parentheses. Since individual licensees may hold more than one licence (the average licensee holds two), assignment of licensees to licence categories was artifically determined, according to the category in which each licensee was selected. Approximately 40% of the licensees contacted indicated that a union was active at their facility.

Assignment of ARW's to licence categories is also somewhat artificial, since their employers often cannot be assigned to a particular category. Specific job descriptions usually permit assignment of workers to a licence category; however, managers seldom had such specific information available and were not prepared to attempt such a classification. As a result, it was suggested that workers themselves would be in a better position to identify a single most appropriate licence category, based on their own work experience. This suggestion was adopted for employee interviews (Section 5.4).

For the purpose of estimating the cross-Canada distribution of ARW's from the telephone survey, the average number of ARW's per licensee was determined for each province (Table 4-2). This provincial average was multiplied by the number of licensees in each province to estimate the number of ARW's in each province. For the Northwest Territories, the average number of ARW's per licensee was assumed to be equal to the Yukon average.

The total number of ARW's in Canada was estimated at about 45,000. This number can be obtained by multiplying the average number of ARW's per Canadian licensee by the number of Canadian licensees, or as the sum of estimated ARW's in each province.

The distribution of ARW's among licence categories can be estimated by assuming a distribution of licensees among licence categories in proportion to the distribution of licences. The number of licensees in each category is then multiplied by the average number of ARW's per licensee to estimate the number of ARW's in each licence category. These estimates are shown in Table 4-3 for Canada as a whole.

TABLE 4-1: DISTRIBUTION OF LICENCES BY TYPE AND PROVINCE (number contacted in parentheses)

Type	1 BC	2 YK	3 NW	4 AB	5 SK	6 MB	7 ON	8 PQ	9 NB	10 NS	11 PE	12 NF	Total
Radioisotope Licences[1]													
ANALYZ CROMAT	64(1)	1	4	47(1)	17(1)	9(1)	211(2)	95(1)	14	13(1)	0	4	479
BRATPY TELTPY	5	0	0	8	4	3	26(1)	21	3	2	2	2	76
CALIBR	47(1)	0	1	48(1)	13(1)	15	309(3)	81(1)	12	15	0	4	545
CONSOLD	4(1)	0	0	5	2	4	12(1)	6	1	3(1)	0	2	39
COM. PROD.	83(1)	1	1	84(1)	19	21	646(6)	261(3)	5	13 (1)	0	5	1,139
GAUGES	155(2)	3(1)	10(1)	177(2)	58(1)	46(1)	481(5)	296(3)	45(1)	36(1)	3(1)	22(1)	1,332
HUM OP SCE	111(1)	0	0	83(1)	27	39	426(4)	275(3)	17	31(1)	3	13	1,025
IRADTR	5(1)	0	0	5	1	2	29(1)	6	0	2(1)	0	0	50
LOGGING	9	0	0	61(4)	7(1)	2	4(2)	2	1	1(1)	0	0	87
RADGFY	21	0	0	65(1)	4	5	82(3)	52(1)	5	8	1	3	246
SUPPLR	7	0	0	14	0	0	129(1)	35	0	2	0	0	187
TARGET	2(1)	0	0	2(1)	0	0	4	4(1)	0	0	0	0	12
Major Facility Licences													
ACCELERATOR[1,3]	6(1)	0	0	8	3	2(1)	21(2)	10	1	3	0	1(1)	55
REACTOR[2,3]	0	0	0	1	1	0	9(1)	3	1(1)	1	0	0	16
HVY WATER[2,3]	0	0	0	0	0	0	1(1)	0	0	2(1)	0	0	3
FUEL[2,3]	0	0	0	1(1)	0	0	5(2)	1	1(1)	0	0	0	8
MINE[2]	0	0	0	0	12(2)	0	7(1)	0	0	0	0	2	21
WST MAN[2,3]	0	0	0	2	0	0	5(2)	1	1	0	0	0	9
TOTAL LICENSES	519	5	16	611	168	148	2,407	1,149	107	132	9	58	5,329
TOTAL LICENSEES	258	4	7	362	87	79	1,327	674	67	74	4	30	2,973
TOTAL CONTACTED	(10)	(1)	(1)	(13)	(6)	(3)	(38)	(13)	(3)	(8)	(1)	(2)	

[1] Based on AECB licence files as of April 1985.
[2] Based on 1984-85 Annual Report.
[3] Licences for construction, decommissioning and "mothballed" facilities excluded.

TABLE 4-2: DISTRIBUTION OF LICENSEES AND ARW's BY PROVINCE

Category in Which Licensee Selected	Mean No. of ARW's/Licensee											
	BC	YK	NW	AB	SK	MB	ON	PQ	NB	NS	PE	NF
ANALYZ CROMAT	9			50	+	+	1	2		+		
BRATPY TELPY							19					
CALIBR	5			5	+		10	1				
CONSOLD	+			+			12			300		
COM PROD				5		+	4	4		4		
GAUGES	7	5		4	2	5	14	7	2	6	3	4
HUM OPSCE	13			40			16	7		+		
IRADTR							7			+		
LOGGING				9	+		4			+		
RADGFY				35			4	6				
SUPPLR							8					
TARGET	+			400								
ACCELERATOR	177					50	+	3				30
REACTOR							1,000		400			
HVY WATER							500			6		
FUEL				35			101					
MINE					200		2,200					
WST MAN							15		+			
Mean[1] All Categories	11.50	5.0	(5.0)	17.51	38.24	6.87	19.56	5.24	10.61	21.83	3.0	5.13
NO. OF LICENSEES	258	4	7	362	87	79	1,327	674	67	74	4	30
EST. NO. OF WORKERS	2,967	20	(35)	6,339	3,327	543	25,956	3,532	711	1,615	12	154

Note: '+' indicates licence types also held by licensees selected in other categories.

[1] Means over multiple categories are weighted in proportion to the number of licences in each category.

TABLE 4-3: DISTRIBUTION OF LICENSEES AND ARW's BY LICENCE CATEGORY

Licence Category	Estimated No. of Licensees[1]	Mean No. of Workers/ Licensee	Estimated No. of Workers
ANALYZ CROMAT	268	6.98	1,871
BRATPY TELPY	42	16.60	697
CALIBR	305	6.57	2,004
CONSOLD	22	60.81	1,338
COM PROD	636	3.59	2,283
GAUGES	744	7.51	5,587
HUM OPSCE	573	13.18	7,552
IRADTR	28	6.12	171
LOGGING	49	7.59	372
RADGFY	137	12.81	1,755
SUPPLR	104	6.98	726
TARGET	7	349.53	2,447
ACCELERATOR	26	56.20	1,461
REACTOR	9	821.38	7,392
HVY WATER	2	219.24	438
FUEL	5	80.01	400
MINE	11	786.43	8,651
WST MAN	5	13.10	66
ALL CATEGORIES	2,973	15.21	45,211

[1] Not to be confused with the number of licences, which is greater.

The distribution depicted in Table 4-3 should be considered approximate, since it is based on a small sample of licensees artificially assigned to the licence categories in which they were selected. Many of the licensees actually held licences in several categories. ARW's were not assigned to licence categories based on their individual job descriptions during this stage of the study.

Chi-square analysis of the radioisotope licence distribution in Table 4-1 indicates that the relative proportions of different licence types vary significantly among provinces (X^2_{121}=716.62). British Columbia, Saskatchewan and Manitoba do not differ significantly (X^2_{22}=27.85). Alberta differs from the other western provinces when logging and radiography categories are included in the analysis (X^2_{33}=112.73), but not when these categories are excluded (X^2_{27}=35.11). The Maritime Provinces do not differ significantly from each other (X^2_{30}=33.28). Quebec differs from the Maritime Provinces when commercial product (SMOKE, STALIM, SURPRO, DEWPTR, LT SCE) licences are included in the analysis (X^2_{44}=98.53), but not when this category is excluded (X^2_{40}=54.54). Ontario differs significantly from all other provinces, mainly as a result of its high relative frequency of commercial product licences, reflecting its manufacturing base.

Management response to the telephone survey, with respect to general employee awareness of the AECB consultation process, is summarized in Table 4-4. Positive responses (workers generally aware) and negative responses (workers generally not aware) were recorded, along with any specific comments reflecting management's perspective. Confidence bands on the percentage of positive responses are included in parentheses where sample sizes warrant. The confidence band narrows with increasing sample size. For Canada as a whole, approximately 54% (41 to 67%) of licensees contacted indicated that their employees were aware of the consultation process. Responses in specific province and licence type categories are consistent with this estimate, and do not suggest any obvious differences in employee awareness between geographic regions.

Management response with respect to employee satisfaction with the level of consultation is summarized in Table 4-5. Positive responses (workers generally satisfied) and negative responses (workers generally not satisfied) were recorded. Some respondents were uncertain about employee satisfaction. These responses were excluded in calculating the percentage of positive responses. Confidence bands were computed for each percentage based on sufficient sample size. For Canada as a whole, approximately 91% (80 to 98%) of responding licensees felt that their employees were satisfied with the

TABLE 4-4: DISTRIBUTION OF WORKER AWARENESS (number of yes/no responses from management)

Category In which Licensee Selected	BC	YK	NW	AB	SK	MB	ON	PQ	NB	NS	PE	NF	% Yes (*)
Analyze Cromat				1/0			1/0	1/0					100
Bratpy Telpy							0/1						0
Calibr	1/0			0/1			0/1	0/1					25
Consold							1/0			1/0			100
Com Prod				0/1			5/0	0/2		1/0			67 (30-92)
Gauges	1/0	0/1		2/0	0/1	1/0	1/2	1/1	0/1	1/0	1/0	0/1	53 (27-78)
Hum Opsce	1/0			1/0			1/2	2/0					71
Iradtr							0/1						0
Logging	1/0			3/1			1/1						67
Radgfy				1/0			2/0	1/0					100
Supplr							1/0						100
Target							0/1						0
Accelerator	0/1					0/1	1/0	1/0				0/1	40
Reactor									1/0				100
Hvy Water										0/1			0
Fuel				0/1			0/1						0
Mine					0/1		1/0						50
Wst Man													
% Yes	80	0		55	0	50	57	60	50	75	100	0	54 (41-67)
(*)				(21-86)			(34-78)	(27-88)					(41-67)

* 95% confidence belt on proportions in parentheses.

TABLE 4-5: DISTRIBUTION OF WORKER SATISFACTION (number of yes/no responses from management)

Category in which Licensee Selected	BC	YK	NW	AB	SK	MB	ON	PQ	NB	NS	PE	NF	% Yes (*)
Analyze Cromat				1/0				1/0					100
Bratpy Telpy							1/0						100
Calibr	1/0			1/0			1/0	1/0					100
Consold							1/0			1/0			100
Com Prod				1/0			5/0	1/1		1/0			89 (52-100)
Gauges	1/0	1/0		1/0	1/0	0/1	3/0	2/0	1/0	1/0	1/0	0/1	86 (57-98)
Hum Opsce				1/0			2/1	2/0					83
Iradtr							1/0						100
Logging	1/0			3/1			1/0						83
Radgfy				1/0			2/0	1/0					75
Supplr							1/0						100
Target							1/0						100
Accelerator	1/0					1/0	1/0	1/0				1/0	100
Reactor									1/0				100
Hvy Water													
Fuel				1/0			1/0						100
Mine					1/0								100
Wst Man													
% Yes	100	100		91	100	50	95	90	100	100	100	50	91 (80-98)
(*)				(58-100)			(75-100)	(55-100)					

* 95% confidence belt on proportions in parentheses.

TABLE 4-6: ASSOCIATION OF WORKER AWARENESS AND SATISFACTION AS REPORTED BY LICENSEES

Number of Licensees Reporting Workers Aware (+)	Number of Licensees Reporting Workers Satisfied (+)			
	+	-	+/-	?
+	26	2	28	9
-	23	3	26	3
+/-	49	5	54	12
?	4	2	6	

+/- Indicates sum of positive (+) and negative (-) responses.

? Indicates undecided licensees.

existing level of consultation. Responses in specific province and licence type categories are consistent with this estimate, and do not suggest any obvious differences in employee satisfaction between geographic regions.

Comparison of Tables 4-4 and 4-5 suggests that many employees are satisfied, even though they may not be aware of the consultation process. This conclusion is supported by a chi-square analysis of association between employee awareness and satisfaction as reported by management in Table 4-6 (X^2_1=0.31). However, it should be emphasized that the conclusion at this stage is based on management's response. Employee responses are summarized in Section 7.

4.2 Comments from Management During Telephone Survey

As indicated on Figure 4-1, comments were solicited from licensee management representatives contacted relevant to their perception of the usefulness of the existing AECB consultation program and any recommendations for improvement. Comments from specific, contacted individuals are listed in Table 4-7, and the most common comments are summarized below.

(a) Most management at licensed facilities were happy with the current AECB information program. However, very few respond to consultative documents. This is generally since they treat these as information sources, feel their comments would not affect the proposed regulations, agree with the proposal, or feel they are not relevant to their company.

(b) Most feel their workers are well informed and satisfied with the level of information provided on regulations.

(c) Many felt the consultative documents are too technical for workers to understand. They only pass on summaries once regulations are finalized. They feel management, as those most responsible for worker health and safety, should act as intermediaries in passing regulatory information from AECB to ARW's.

(d) Many licensees with unions expressed concern about contacting the union. Only a minority of the unionized employees are designated as ARW's in most cases, and management saw the survey as potential source of alarm to other workers not involved with radioisotopes. In general, these same companies were happy to have ARW's contacted.

TABLE 4-7: SPECIFIC COMMENTS MADE BY LICENSEE MANAGEMENT IN TELEPHONE SURVEY

1. X-ray technicians not under AECB licence. However, some institutions designate them as ARW's.
2. Mail list best information approach. Pleased with the current AECB information program.
3. More information desired on an industry (licence-type) specific basis.
4. Management concern over contacting employees/union. Feel all such contacts should be through management as intermediary.
5. Worker complaints about difference between male and female dose limits.
6. Find consultative documents informative but do not respond unless relevant to their work.
7. Feel personal contact AECB needed for when questions arise (possibly periodic seminars).
8. Most regulations not pertinent and confusion results. A summary of pertinent regulations on an industry-specific basis would be useful.
9. Irregularity of consultative documents makes them wonder if they miss some (suggest newsletter on a regular basis).
10. Concerns by non-ARW's (i.e., cleaning staff, workers in other areas who see radiation signs) are a major worry. A very non-technical information approach is needed.
11. Concern/confusion regarding ARW definition. Some did not know the term. Others designate ARW's by completely different criteria.
12. Follow-up response from AECB summarizing comments on consultative documents needed to show how comments are incorporated into final regulations.
13. Feel they are overregulated/licence applications take too much time.
14. Workers feel new regulations becoming too lenient.
15. Information too complex for workers.
16. Need more information on rationale for regulations.
17. Metrification causes confusion.
18. Afraid AECB will use information from survey to increase regulation of specific licensee.

(e) Few understood the definition of ARW and some use their own interpretation of the definition as a reason not to designate workers. A common attitude was: "since our business has never had accidental exposures exceeding the ARW definition, we assume we never will and thus have not designated any ARW's".

(f) Other methods for AECB to keep licensee workers informed were suggested, including seminars, a regular newsletter, and a contact number (see Table 4-7).

(g) The April 1985 computer print-out was somewhat outdated. At least four companies we attempted to contact were out of business, one contact name had died and at least two retired, about 10% of telephone numbers had changed and about 20% of the time we were referred to a new licence contact person.

4.3 Results of Union/Professional Association Survey

Thirteen unions or professional associations representing employees of AECB licensees were identified by management personnel during the preliminary telephone survey of licensees. Of these organizations, 11 were contacted during a similar telephone survey of organizations representing employees. The personnel contacted, usually either local or head office presidents, were asked whether employees of AECB licensees within their organization were generally aware of the AECB's consultation process, and whether those employees were generally satisfied with the consultation effort. They were also asked to estimate the number of designated ARW's and the number of non-designated ARW's within their membership.

Most union/association contacts indicated that they were unable to respond with specific reference to any particular licence category. Overall results with regard to perception of worker awareness of and satisfaction with AECB's consultation process are summarized in Table 4-8. Respondants collectively estimated that they represented 2,431 designated ARW's (based on four estimates) and another 3,116 non-designated ARW's (based on two estimates). Five respondants were unable to provide estimates.

From Table 4-8, it appears that approximately 40% (4/10) of decided employee representatives felt that workers were aware of the AECB's consultation process, and that approximately 38% (3/8) of decided representatives considered their workers satisfied with the consultation process. The awareness estimate is only slightly lower than that suggested by employers (40% vs 54%). However, the satisfaction estimate is

TABLE 4-8: WORKER AWARENESS AND SATISFACTION AS REPORTED BY EMPLOYEE ORGANIZATIONS

Response Parameter	Number of Organization Responses			
	+	-	+/-	?
Worker Awareness	4	6	10	1
Worker Satisfaction	3	5	8	3

considerably lower than that suggested by employers (38% vs 91%). It also appears that employee representatives were less certain than management about employee attitudes, or less able to generalize. This might be expected from the fact that the membership of employee organizations may represent many different licensees and licence categories, as well as non-licensed employers.

4.4 Comments from Unions and Associations During Telephone Survey

Union and professional association representatives were invited to comment on their perception of the usefulness of AECB's consultation program and to suggest possible improvements. The most common comments are summarized below:

(a) most unions contacted felt that there was a need for this study, either to determine employee attitudes or to identify necessary improvements to the consultation process;

(b) most unions considered occupational health and safety concerns of workers to be part of their mandate and were involved in health and safety committees, either jointly with management or independently; and

(c) several unions suggested that literature should be sent directly to workers by the AECB, as well as to employers.

Other comments from specific contacted individuals are listed in Table 4-9. The desire for legislation of health and safety committees (Comment No. 5) has been expressed previously by union representatives (e.g., Heard, 1985).

TABLE 4-9: SPECIFIC COMMENTS MADE BY EMPLOYEE ORGANIZATIONS IN TELEPHONE SURVEY

1.	Need for evaluation of the AECB employee consultation process.
2.	Need for improvement of the AECB employee consultation process.
3.	Unions have a mandate to represent workers in occupational health and safety.
4.	Literature should be sent directly to workers by the AECB.
5.	Health and safety committees should be legislated and basic structure defined.
6.	Higher standards for radiological health and safety are needed.
7.	There should be regular meetings between employees and AECB representatives.
8.	Feeling of distrust of AECB due to close relationship with management.
9.	Little concern about radiological health and safety issues due to low activity levels.

5. SURVEY OF ATOMIC RADIATION WORKERS

5.1 Questionnaire Design

The questionnaire design process included two stages of development. An initial pre-test questionnaire contained a large proportion of "open" questions. Open questions require written or verbal expression of opinions. The purpose of open questions in a pre-test is to maximize information on the full spectrum of respondents' views while minimizing the effect of the researcher's preconceptions on the responses (Whyte, 1977). Open questions are time-consuming to complete, responses are difficult to quantify, and respondents often require considerable one-on-one personal contact with the interviewer in order to clarify question intent. However, a list of responses to open questions can be used to develop "forced-choice" questions during the second stage of questionnaire design.

Forced-choice questions ask the respondents to select from a list of given alternatives those that come closest to representing their own view. The advantage of this approach is that question intent is clearly specified by the alternatives, permitting rapid completion and subsequent quantification of responses. The risk of misinterpretation is reduced, facilitating later comparisons among respondents.

The pre-test helps to identify any ambiguities in working that might lead to misinterpretation. Ambiguities can then be clarified during the second stage of questionnaire development.

5.2 Pre-test and Revision

The pre-test took place at the University of Toronto in April 1985. The University of Toronto was chosen because it holds a diverse collection of AECB licences and consequently employs a group of ARW's. Personal interviews were conducted on the campus. A sample size of 29 respondents was obtained, including workers from each laboratory. After completing the questionnaire, each respondent was asked for comments on any ambiguities encountered.

The pre-test questionnaires (Appendix A) were subsequently analyzed. Some redundant questions were removed, based on the fact that most respondents interpreted and answered them in the same way. Lists of responses were drawn up for inclusion in forced-choice questions. Where a wide range of responses was obtained, common

responses were listed as forced-choice alternatives, and 'another' alternative was included to allow for unlisted responses.

The original pre-test questionnaire took approximately 20 minutes for each personal interview. Based on respondents' comments, this was judged as too lengthy. Some respondents lost interest about half-way through the interview, possibly undermining the quality of responses. The revised questionnaire, Appendix A, took approximately ten minutes for each respondent to complete. The revised questionnaire was finalized in consultation with the AECB Scientific Authority.

The final questionnaire was designed directly to measure the employees': awareness of the AECB and its regulatory function, participation in the AECB's consultation process, satisfaction with the consultation process, desire for increased participation, and preferred mechanisms of consultation.

The questionnaire was also designed to identify key factors which may influence the employees' response. Possible factors considered include: age, sex, education and income; perception of radiation hazards on the job; length of time on the job; designation as an ARW; union or professional association membership; work in a radiation area; and handling of radioactive materials.

Responses to questions of satisfaction and perception are difficult to quantify on a standardized scale without introducing highly technical response parameters. Verbal terms do not necessarily have the same precise meaning or quantitative implications for all respondents. However, the response scale for radiation safety issues can be calibrated against the response to similar non-radiological safety issues. For this reason, questions pertaining to worker satisfaction with consultation processes and mechanisms of consultation in non-radiological health and safety areas were included in the questionnaire.

Questions 21 to 34 pertaining to the evaluation of consultation mechanisms were presented in reverse order on some questionnaires, in order to guard against response-order bias. In long lists of alternative choices, there is a tendency to choose or prefer the top items in the list. List reversal compensates for this effect. At each interview session, some questionnaires of each type were used.

5.3 Sample Selection

Sampling of ARW's as questionnaire respondents was confined to the Province of Ontario for all radioisotope licence categories. While the distribution of licence types in Ontario differed from that in other provinces, reflecting the greater degree of industralization in Ontario, there was no indication from the preliminary survey of licensee management that employee awareness of or satisfaction with the consultation process was likely to differ greatly from one province to another. The majority of radioisotope licensees are located in Ontario.

However, there were circumstantial reasons to suspect possible differences in employee response between eastern and western uranium mine/mill facilities. In particular, high grade non-pyritic ores are found in Saskatchewan whereas Ontario ores are typically low grade pyritic deposits. The potential for human radiation exposure is greater in high grade mines and, at some locations, open pit rather than underground techniques are used. Consequently, both Saskatchewan and Ontario mines were invited to participate in the survey.

There were also reasons to suspect possible differences in response of reactor employees between Ontario and other provinces. In particular, a recent labour-management confrontation at some Ontario reactor facilities may have influenced employee attitudes. Consequently, employees at a similar facility in New Brunswick were also surveyed. Invitations to include a Quebec reactor facility were declined.

A cluster sampling program was used to sample licensees within each licence category. Each licensee which agreed to participate was asked to arrange interviews with available ARW's. ARW's were defined to include employees who either handled radioactive materials in the course of their work, worked in a designated radiation area, or were individually designated as ARW's. At most facilities, all available ARW's were interviewed. Representative samples of 50 to 100 workers were selected at some of the larger facilities.

The definition of an ARW (Section 3) is not precise, and in practice may differ considerably from one licensee to another. There are workers who handle radioactive materials, or work in designated radiation areas, who are not designated as ARW's by their employers. Similarly, there are designated ARW's who do not handle radioactive materials or work in radiation areas. Many are designated as a matter of convenience, or

of conservative company policy. It is often administratively easier to designate and monitor all employees than to differentiate between designated and non-designated staff. However, all designated ARW's are likely to consider themselves to be targets of the AECB consultation process, as are other employees who handle radioactive materials or work in radiation areas.

5.3.1 Selection of Licensees

Licensees were selected by stratified random sampling from the catalogue of licensees. Radioisotope and accelerator licensees are catalogued by licence type on AECB computer files. Other licensees are listed by licence type in the 1984-85 Annual Report.

Sampling effort within the major radioisotope licence categories was approximately 1% of the number of licensees. In other licence categories, sampling effort was approximately 10% of the number of licensees. The additional effort in these categories is consistent with the greater average number of employees per licensee in the non-radioisotope categories. Also, in non-radioisotope licence categories, the small number of licensees precludes sampling at a 1% level of effort.

Each licensee selected constituted a cluster of employees in the cluster sampling program. The employees interviewed in each cluster were considered to be representative of ARW's at their licensed facility.

5.3.2 Selection of Employees

At most licensed facilities selected for the survey, the population of ARW's was fully canvassed, except for occasional absentees. Most licensed facilities are licensed in a radioisotope licence category. In these licence categories, the number of ARW's is typically small and easily canvassed.

At the larger licensed facilities (more than 100 ARW's), representative samples of employees were selected. In these cases, the sampling plan within the facility was specifically designed to include employees from each shift and/or relevant department. The plan was typically designed by management in consultation with union and/or BEAK staff.

The degree of BEAK involvement in sampling within facilities varied. Some facilities provided employee lists, permiting BEAK to design and conduct the sampling. Other

facilities were reluctant to provide employee lists and conducted their own sampling of employees. In either case, BEAK staff were usually present to conduct employee interviews and answer any questions. In general, few questions of interpretation arose.

5.4 Employee Interviews

The preferred method for questionnaire administration was a group interview session. Groups of up to 50 employees were gathered in a lunch or conference room and questionnaires distributed. A BEAK researcher was present to provide instructions, answer queries regarding instructions, or help respondents who did not understand particular questions. Generally, there were very few problems with the questionnaire (the result of a successful pre-test).

The group interviews made it possible to interview large numbers of employees quickly with their full attention to the questionnaire. Some employers were not prepared to gather employees into group situations because of the nature of their work. These included factories with assembly line production and hospitals where most medical personnel are on constant call. In these cases, personal one-to-one interviews were the preferred alternate method. In some cases, questionnaires were distributed to employees who were asked to fill them in when they had time (i.e., on lunch or at home) and return them to the employer who forwarded the completed questionnaires to BEAK. This was only done when the two preferred methods were not feasible or possible. Rates of return in this situation averaged about 80%. The main disadvantage of leaving questionnaires with respondents or employers is the lack of verified quality control. The possibility exists that the employer could remove questionnaires with "negative" responses or change responses. The possibility of interaction among respondents also exists. Interaction is not desirable since questionnaire responses are assumed to be independent. These potential problems could not arise in group or personal interviews where BEAK researchers directly administered and collected the survey.

6. LABOUR-MANAGEMENT FACTORS

Labour-management relations are potentially important as factors influencing employee response. During periods of confrontation, opinions tend to become polarized. Polarization is not necessarily confined to the specific issues under negotiation. It is a particularly important consideration when radiation safety issues are under dispute.

Labour-management factors were cited previously as part of the rationale for including provinces other than Ontario in the survey of reactor licensees. Ontario power reactors and heavy water facilities were involved in protracted negotiations with their union throughout the spring and summer of 1985. Salaries, benefits and job security were the primary issues. However, safety issues were raised during this period, and were subject to press coverage. A wildcat strike erupted at one point, during which management took over essential staff functions. During a subsequent legal strike, AECB permission was required for continued operation of the nuclear plant in question, and was eventually granted when management staff had received adequate training. Employee attitudes towards management, safety and the AECB were highly polarized at this time.

Contract issues were eventually resolved by arbitration, and the final contract was signed in the fall of 1985. Employee interviews were postponed until after the contract signing, by mutual agreement of the reactor facilities and the AECB.

Labour-management relations also played a significant role in determining access to mine sites for survey of uranium mining sector employees and in determining details of survey administration. All western mine licensees contacted expressed concern about questioning employees on their preferred mechanisms of consultation with the AECB, since the list of possible mechanisms included and implicitly acknowledged a possible union role in the consultation process. Some licensees also objected to questions concerning union membership which were designed to detect possible differences in attitude between union and non-union employees.

An attempt was made to obtain union-management cooperation in organizing employee interviews with BEAK staff. This was considered advisable in a polarized situation in order to increase the likelihood of obtaining a representative sample of employees and to reduce the chance of one side or the other influencing employee responses. However, none of the western mines approached would agree to this arrangement. One Ontario mine agreed to work with the union, though not on company time, and this arrangement

was unsatisfactory to the union. Union elections underway at this time may have been a key factor.

In order to gain the cooperation of the western uranium mines, it was decided, in consultation with the AECB Scientific Authority, to permit company revision of the questionnaire. The mining companies were re-invited to participate under these conditions, and encouraged to involve union representatives in the questionnaire review and organization of employee interviews. This new invitation was also extended to Ontario uranium mines and power reactor facilities.

Two western uranium mines, one with a union and the other without, agreed to participate under these conditions. The revised questionaires are included in Appendix A. Both companies insisted on deletion of Questions 36 through 39. The non-unionized mine also insisted on deletion of Questions 40 through 43, in addition to minor revisions to other questions. The minor revisions included clarification of some terms in the specific context of uranium mining, and removal of all references to unions. This mine also insisted on administering the questionnaire themselves, although BEAK was granted observer status.

Ontario power reactor and heavy water facilities agreed to participate in the survey subject to revision of Questions 14, 17, 19 and 40 for all facilities, and additional revisions to Questions 6, 9, 11, 12, 16, 17, 18 and 19 at the heavy water plant. The changes to Questions 14 and 19 at all facilities reflected an acknowledgement of the employer's role as an intermediary in the AECB's employee consultation process. The changes for heavy water plant interviews reflected AECB's primary concern with H_2S poisoning, rather than radiation, as a safety issue at heavy water plants. Other minor revisions to Questions 17 and 40 provided clarification of terms in the specific context of reactor operations. Revised questionnaires are included in Appendix A.

The questionnaire revisions required as a result of labour-management factors complicate the interpretation and analysis of survey results in the uranium mining sector. In the unionized mine, many employees used Questions 40 and 41 to indicate that they belonged to the union. This information was utilized even though respondants were not asked to provide it. Employees at the non-unionized mine did not have the same opportunity to indicate either union or professional association membership. Thus, in analysis of response variation with union membership, union members were over-represented in the mining sector. The minor revisions to other questions were not considered to alter significantly employee interpretation.

In the power reactor sector, the revisions were considered, a priori, to be minor. However, the revisions for the heavy water plant altered the issues fundamentally, from radiation to H_2S hazards, reflecting a very different focus in AECB's consultation efforts here, as compared to other licensed facilities. This must be considered in any comparison among licence categories.

7. SURVEY RESPONSE AND EVALUATION

A total of 543 questionnaire responses were obtained from employees. One hundred and fifty-four or 28% of these respondants gave definite responses to all 47 questions. Fifty-one percent of respondents were union members. As discussed in Section 6, some major facilities insisted on deletion of certain questions as a condition of participation in the survey. Thus, the number of valid responses may vary from one question to another, and from one analysis to another, depending on the number of questions used for each analysis. All major licence categories were represented, in approximate proportion to the estimated number of workers in each category. Several minor licence categories were excluded from the sample, since no workers specifically assignable to those categories were found. These categories included CALIBR, SUPPLR and WSTMAN. Workers performing these functions are likely included under other licence categories. For example, reactor workers typically perform waste management functions on a rotating part-time basis.

The questions presented to employees, and the answers provided, were divided into two groups of variables. Response variables were considered to measure employee awareness of, participation in, and satisfaction with the AECB public consultation process. Responses pertaining to health and safety consultation by other agencies were included in this variable set for comparative purposes. Grouping variables were considered as factors which could potentially influence the employee response. Relationships between grouping variables and response variables were examined in detail, along with relationships between response variables.

Table 7-1 summarizes response variables for the employee sample as a whole, without regard to grouping variables, such as licence category. A complete breakdown of responses by licence category is included in Appendix B. Table 7-2 summarizes characteristics of the employee sample in terms of grouping variables, such as union or professional association membership, ARW status, or socio-economic factors.

Average employee responses can be expressed either for the employee sample or for the Canadian population of employees as estimated in Table 4-3. Table 7-1 shows both estimates of the mean response for selected key response variables. Differences between the two means reflect differences between sample and population in distribution of employees by license category. Sample and estimated population means were very similar.

TABLE 7-1: MEANS OF EMPLOYEE RESPONSE VARIABLES

Variable	Sample Mean	Std Dev	Minimum	Maximum	N	Pop'n Mean
V1	1.07	.25	1.00	2.00	524	1.05
V2	1.20	.40	1.00	2.00	543	1.18
V3	1.17	.38	1.00	2.00	487	1.26
V4	1.46	.50	1.00	2.00	541	1.47
V9	2.00	1.00	1.00	5.00	540	2.01
V10	2.08	.80	1.00	5.00	541	1.99
V11	3.76	4.26	1.00	14.00	542	
V12	3.69	3.72	1.00	14.00	541	
V13	.71	3.85	0.0	50.00	533	1.27
V14	2.47	7.13	0.0	65.00	487	4.16
V15	2.61	5.04	0.0	50.00	457	2.30
V16	2.15	1.06	1.00	5.00	525	2.18
V17	2.13	.95	1.00	5.00	535	2.11
V18	1.41	.49	1.00	2.00	448	1.42
V19	3.78	1.16	1.00	5.00	456	3.34
V20	3.33	1.13	1.00	5.00	496	3.58
V21A	5.49	2.80	1.00	10.00	515	
V21B	5.36	2.90	1.00	10.00	501	
V22A	4.78	2.66	1.00	10.00	520	
V22B	2.46	2.26	1.00	10.00	457	
V23A	6.97	2.45	1.00	10.00	521	
V23B	6.48	2.72	1.00	10.00	497	
V24A	5.87	2.57	1.00	10.00	517	
V24B	4.90	2.77	1.00	10.00	492	
V25A	6.71	2.55	1.00	10.00	521	
V25B	3.33	2.93	1.00	10.00	457	
V26A	4.10	3.00	1.00	10.00	494	
V26B	6.03	2.91	1.00	10.00	501	
V27A	6.84	2.51	1.00	10.00	518	
V27B	6.61	2.65	1.00	10.00	501	
V28A	5.59	2.72	1.00	10.00	506	
V28B	4.68	2.93	1.00	10.00	491	
V29A	4.86	2.68	1.00	10.00	513	
V29B	4.01	2.69	1.00	10.00	486	
V30A	5.85	2.69	1.00	10.00	519	
V30B	5.43	2.79	1.00	10.00	493	
V31A	5.48	2.70	1.00	10.00	516	
V31B	2.55	2.41	1.00	10.00	455	
V32A	5.77	2.87	1.00	10.00	514	
V32B	5.84	2.93	1.00	10.00	496	
V33A	4.58	2.69	1.00	10.00	517	
V33B	2.47	2.29	1.00	10.00	461	
V34A	7.31	2.37	1.00	10.00	521	
V34B	5.22	3.18	1.00	10.00	481	
V35	1.94	.23	1.00	2.00	543	

TABLE 7-2: AVERAGE CHARACTERISTICS OF THE EMPLOYEE SAMPLE IN TERMS OF GROUPING VARIABLES

Variable	Mean	Std Dev	Minimum	Maximum	N	
V5	1.23	.42	1.00	2.00	533	
V6	1.14	.35	1.00	2.00	532	
V7	1.28	.45	1.00	2.00	486	
V8A	6.61	5.02	0.0	35.00	527	
V8B	7.00	13.47	0.0	98.00	495	
V36	1.49	.50	1.00	2.00	492	
V38	1.74	.44	1.00	2.00	446	
V39	2.60	1.16	1.00	5.00	438	
V40	1.72	.45	1.00	2.00	408	
V42	1.83	.38	1.00	2.00	363	
V43	2.51	.99	1.00	5.00	362	
V44	34.50	8.51	20.00	65.00	527	
V45	1.12	.33	1.00	2.00	525	
V46	2.94	.92	0.0	4.00	525	*
V47	4.34	.90	1.00	5.00	507	

* V46 'no formal education' recoded from 5 to 0.

Average responses are meaningful only for ordinal variables where possible responses are arranged in some logical sequence. Questions 11 and 12, in which respondants indicated who they would first approach with radiological and non-radiological health and safety problems, represented non-ordinal response variables. For these two variables, the distribution of first choices was described, and the most popular choice in response to each question was identified. Response distributions are illustrated in Figure 7-1.

Geographical comparisons between provinces were possible within the REACTOR licence category. Two reactor facilities in Ontario and one facility in New Brunswick were included in the employee sample. The breakdown of employee response by licence category (Appendix B) lists these facilities separately. Any apparent differences in response between reactor facilities are discussed in the text. Similarly, responses from two Saskatchewan uranium mines are listed separately in Appendix B.

A number of relational variables were calculated reflecting the difference between employee responses concerning AECB and those concerning other agencies. For example, the response for awareness of AECL (1 = yes, 2 = no, Question No. 1) was subtracted from that for awareness of AECB (same scale, Question No. 3) to indicate whether each respondant was more or less aware of AECB as compared to AECL. Similarly, satisfaction with AECB's consultation effort was related to satisfaction with other regulatory agencies (Question No. 19 response minus Question No. 20 response).

Other relational variables were calculated to adjust for time on the job as an ARW. For example, participation in the consultation process was measured in terms of number of contacts made to AECB or number of consultative documents received from AECB per year as an ARW (Question No. 13 or 14 response divided by Question No. 8 response), as well as over the respondant's lifetime. Finally, a relational variable was calculated for each Question 21 through 34, in which respondants rated specific consultation mechanisms according to their value in (A) communicating opinions to, and (B) receiving information from AECB (1 = poor, 10 = excellent). The relational variables (Score A - Score B) reflected the employee's impression of directionality in each consultation method. Relational variables are summarized in Table 7-3.

Relationships between pairs of variables were investigated by several methods, according to whether the variables were discrete or continuous in nature. Categorical variables, with a small number of possible responses, were tested for relationship to other categorical variables by means of chi-square contingency analysis. Effects of

FIGURE 7-1: EMPLOYEE RESPONSE DISTRIBUTION - QUESTIONS 11 AND 12

Who would you most likely contact for information about:

radiation health and safety

QUESTION 11

```
1.00 XXXXXXXXXXXXXXXXXXXXXXXXXXXX 296
2.00 XXXX 31
3.00 XXXXXX 59
4.00 XXXX 30
5.00   1
6.00 XXX 17
7.00   3
9.00   2
10.00 XXX 18
11.00 XXXX 31
12.00 XX 8
13.00 XXX 23
14.00 XXX 23
```

other health and safety

QUESTION 12

```
1.00 XXXXXXXXXXXXXXXXXX 207
2.00 XXXXXXXXX 90
3.00 XXXXXXXXXX 109
4.00   5
5.00   1
6.00 XXX 22
7.00 XXX 22
9.00 XX 9
10.00 XXX 27
11.00 XX 12
12.00 XX 11
13.00 XX 10
14.00 XX 16
```

LEGEND:

1. safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other

TABLE 7-3: MEANS OF RELATIONAL VARIABLES COMPUTED FROM EMPLOYEE RESPONSES

Variable	Mean	Std Dev	Minimum	Maximum	N
N1R2	-.10	.31	-1.00	0.0	524
N3R4	-.24	.43	-1.00	0.0	487
N1R3	-.09	.39	-1.00	1.00	475
N2R4	-.27	.49	-1.00	1.00	541
N13R8	.13	.50	0.0	5.00	366
N14R8	.54	1.73	0.0	20.00	327
N15R8	.50	.98	0.0	10.00	309
N16R17	.75	.44	0.0	1.00	524
N9R10	-.08	.90	-4.00	3.00	538
N19R20	.44	1.16	-4.00	4.00	444
N21	.19	2.24	-9.00	9.00	496
N22	2.32	2.83	-7.00	9.00	454
N23	.50	1.73	-6.00	8.00	494
N24	.97	2.28	-7.00	9.00	489
N25	3.39	3.33	-9.00	9.00	455
N26	-1.91	3.48	-9.00	8.00	475
N27	.26	1.88	-8.00	8.00	496
N28	.92	2.73	-9.00	9.00	482
N29	.84	2.10	-7.00	9.00	483
N30	.45	2.17	-9.00	8.00	491
N31	2.93	3.03	-7.00	9.00	454
N32	-.01	2.13	-8.00	8.00	489
N33	2.04	2.65	-6.00	9.00	459
N34	2.14	2.98	-8.00	9.00	478

categorical variables, such as union membership, on continuous variables, such as number of contacts to AECB per year, were tested by Kruskal-Wallis analysis of variance, a non-parametric technique. Relationships between continuous variables, such as contacts per year and age, were tested by means of rank correlation analysis.

Continuous variables were also recorded into categories and subjected to chi-square contingency analysis. For this purpose, age was recoded into two categories (young = 20-41 and old = 42-65). Counts and counts per year, such as contacts to AECB, consultative documents (or notices) seen, and press releases (or articles) seen, were similarly recoded into two categories (0 and 1-or-more). Results based on recoding in this manner were compared to those obtained prior to recoding.

Relationships between key variables based on chi-square contingency analysis are summarized in Table 7-4. Positive relationships are indicated by '+' and negative relationships are indicated by '-'. Other relationships, though significant, were non-linear and not easily summarized in unidirectional terms. These are indicated by '*'. Contingency tables and chi-square values are given in Appendix C.

Relationships between key variables based on Kruskal-Wallis analysis of variance or rank correlation analysis are summarized in Table 7-5. Complete analyses and test statistics are included in Appendix C.

Specific employee responses are discussed in Sections 7.1 through 7.4. These sections highlight the most important analytical results and present conclusions or recommendations based on these results: Section 7.1, employee awareness of the AECB and its regulatory function; Section 7.2, employee satisfaction with the public consultation process; Section 7.3, employee participation in the public consultation process and the desire for greater participation; Section 7.4, preferred mechanisms of consultation. Recommendations for improvement of the consultation process are included in Section 8.

7.1 Employee Awareness of the Consultation Process

A key question pertaining to employee awareness of the consultation process is employee awareness of the AECB (Question No. 1). A related question is whether the employee correctly understands the regulatory function of the AECB (Question No. 2). The majority of respondants were both aware of the AECB (93%) and correctly understood its

TABLE 7-4: RELATIONSHIPS AMONG EMPLOYEE RESPONSES - CHI-SQUARE CONTINGENCY ANALYSIS

Question No.		1	2	13	14	15	16	18	9	19
Meaning		Awareness of AECB	Correct Re Function	Contacts to AECB	Consultative Documents	Press Releases	Desire for Cons	More Participation	Feeling of Safety	Worker Satisfaction
Grouping Factors										
36	Union Membership	+	+	-	-	+		+	-	
40	Ass'n Membership				+			-	+	
44	Age			+	+	+			+	+
45	Male Sex	+	+			+				
46	Education	*	+		*	-	*	-	+	-
47	Income	+	+		+		*		+	
7	ARW Status	+	+			+				
Response Variables										
1	Awareness of AECB				+	+		+		
2	Correct re Function				+	+			+	
13	Contacts to AECB			+	+	+			*	
14	Consultative Doc's			+	+	+			+	+
15	Press Releases			+	+	+			+	+
16	Desire for Cons									
18	More Participation								-	
9	Feeling of Safety									
19	Worker Satisfaction									

+ Positive relationship.

- Negative relationship.

* Significant but non-linear relationship, $p < 0.05$.

Age categories = 20 - 41, 42 - 65.

Questions 13 - 15 categories = 0, 1 or more.

TABLE 7-5: RELATIONSHIPS AMONG EMPLOYEE RESPONSES - KRUSKAL-WALLIS AND CORRELATION ANALYSES

Question No. / Meaning	13 Contacts to AECB	13 Consultative Documents	14 Press Releases	13/8 Contacts to AECB Per Year	14/8 Consultative Documents Per Year	15/8 Press Releases Per Year
Grouping Factors						
36 Union Membership		-	+	-	-	
40 Ass'n Membership		+		+	+	
44 Age*	+	+	+			
45 Male Sex			+			
46 Education		+			+	
47 Income			+			
7 ARW Status			+			
Response Variables						
13 Contacts to AECB*	+	+	+	+	+	+
14 Consultative Documents*	+	+	+	+	+	+
15 Press Releases*	+	+	+	+	+	+

* Indicates rank correlation analysis, other relationships based on Kruskal-Wallis test.
\+ Positive relationship.
\- Negative relatioship, $p < 0.05$.

function (80%). Most of the few respondants who incorrectly stated the AECB's function confused its role with that of AECL, mentioning, for example, reactor sales or research. Awareness and understanding of AECB was better, however, than awareness and understanding of AECL (Questions 3 and 4, 83 and 54% respectively). These percentages can be inferred from the mean response scores in Table 7-1 which also gives the number of respondants to each question.

Awareness of AECB and correct understanding of its function showed similar patterns of variation with socio-economic grouping factors. Both measures increased with union membership, male sex, income and ARW status (Table 7-4). Correct understanding (and expression) of the AECB's function increased with education. Awareness of AECB was also associated with educational level, but that relationship was non-linear.

Specific awareness of the consultation process was measured in terms of the number of AECB consultative documents (notices) or press releases (articles) seen by employees. The average ARW sees, or is made aware of, 0.54 consultative documents per year and 0.50 press releases per year (Table 7-3). The number of notices seen per year increases with education and professional association membership. However, with union membership, the number of consultative documents seen per year decreases (Tables 7-4 and 7-5).

Forty-four percent of respondants indicated that they had seen consultative documents, while 55% indicated that they had seen press releases in their lifetime. The total number of consultative documents seen increases with professional association (not union) membership, age and income. The total number of press releases seen increases with union membership, age, male sex, education, income and ARW status.

In summary, most of the licensee employees were aware of AECB and its responsibilities towards their protection. Approximately half of the survey respondants had seen consultative documents, and half had seen press releases issued by the AECB. Awareness of AECB was stronger among unionized than non-unionized employees. However, the non-unionized employees (most of whom belonged to professional associations) were much more aware of the AECB consultative process.

7.2 Employee Satisfaction with the Consultation Process

Employees were asked, in Question No. 19, to indicate the extent to which AECB had done a good job in consulting with them. The average response on a scale of 1 = very

good to 5 = very poor was 3.78, indicating that they felt a fairly poor job had been done. The most common response (35% of employees) was 5, indicating opinions of a very poor job. With respect to other agencies, departments and safety associations, the average response was 3.30, indicating that respondents felt a more adequate job had been done by other (unspecified) regulatory agencies.

Employee satisfaction increased with age, but decreased with education (Table 7-4). Consultative documents (notices) and press releases (articles), when seen by employees, both had a positive effect on satisfaction. There was no relationship between employee awareness and satisfaction, as also indicated by the responses of employers speaking on the workers behalf (Section 4.1).

The employee's feeling of safety from radiation hazards did not seem to influence his level of satisfaction (Table 7-4). The feeling of safety was increased by receipt of consultative documents (notices) and reading of press releases (articles), and also increased with age, education, income and professional association membership. Union membership was inversely related to the feeling of safety. Employees felt about as safe from radiation hazards as from other hazards on the job, with an average response in both cases of approximately 2 = fairly safe on a scale of 1 = very safe to 5 = not safe at all (Table 7-1).

In summary, although the average licensee employee felt reasonably safe from radiation hazards, most employees were not satisfied that a good job had been done in consulting them. This feeling was particularly prevalent among the younger employees. Unionized employees felt less safe on the job than their non-unionized counterparts. Therefore, it is logical that they might be more concerned about increasing the level of consultation (see Section 7.3 below).

7.3 Employee Participation in the Consultation Process

Employee participation was measured in terms of number of contacts made to AECB in order to express opinions (Question No. 13). The average number of contacts per year as an ARW was 0.13 (Table 7-3). Annual contact with AECB tended to increase with professional association membership and to decrease with union membership (Table 7-5). The total number of contacts, over the worker's lifetime, was also related to age (Table 7-4). Twelve percent of respondants had made such contacts.

Consultative documents (notices) and press releases (articles) received by employees may be considered measures of employee participation, although they are discussed under 'employee awareness' (Section 7.1). Annual receipt of consultative documents (Question No. 14) follows a similar pattern to contact with AECB (Question No. 13), increasing with professional association membership, and inversely related to union membership.

The desire for participation in the consultation process was measured by two response variables. Employees were asked to indicate the extent to which workers should be consulted by AECB (Question No. 16) and whether they would like to be more active in the consultative process than at present (Question No. 18). The average response to the first question was 2.15 on a scale of 1 = constant consultation to 5 = none, indicating that a lot of consultation was desired (Table 7-1). Employees gave essentially the same response with respect to other (unspecified) regulatory agencies (Question No. 17).

Fifty-nine percent of respondants indicated that they would like to be more active than at present in consultation with AECB. This percentage can be inferred from the mean response to Question No. 18 in Table 7-1. Alternative responses were 1 = yes or 2 = no. The desire for more consultative activity was directly related to union membership and inversely related to professional association membership. It was also inversely associated with the feeling of safety from radiation hazards and educational level (Table 7-4).

As noted before, while the average employee at licensed facilities is aware of AECB and feels relatively safe in his job, he is not satisfied that a good job has been done of consulting him. Unionized employees feel less safe on the job than non-unionized employees and, therefore, feel a greater need for increased participation in the consultation process.

Interestingly, although union members appeared more aware of AECB than their non-union counterparts, as a whole, they were less apt to see and read consultative documents or contact AECB directly. They tended to rely more on the media for such information, either by choice or necessity. This may result in part from the fact that some of the larger union groups had had recent disputes with management in which it was felt AECB sided with management. Many of the union leaders interviewed expressed the opinion that AECB spent all of its time with management and had little direct involvement with employees or unions.

7.4 Preferred Mechanisms of Consultation

In Question No. 11, employees were asked to indicate who they would most likely contact for information on radiation health and safety (or H_2S health and safety for the HVYWAT licence category). Fifty-five percent of respondants indicated that they would first approach their radiation safety officer. Their supervisor was the next most popular choice (11%), followed closely by their safety committee (6%) or some other expert (Figure 7-1). The same order of preference was expressed with respect to other types of health and safety information (Question No. 12, Figure 7-1).

In Questions 21 through 34, respondants were asked to rate specific consultation mechanisms on a scale of 1 = very poor to 10 = excellent for (A) providing information to the employee, and (B) expression of opinion to AECB.

Table 7-1 shows the average scores. Workshops and safety committees received the highest scores (approximately 7) and were considered two-way channels of information exchange. Table 7-3 shows that the average A-B difference was small for these consultation mechanisms. Educational programming was also highly rated as a mechanism of transmitting information to employees.

All groups surveyed agreed that the best consultation process would include direct two-way interaction with AECB. Employees and their union or professional association representatives recommended three approaches:

(a) Workshops, where employees can interact with AECB representatives directly to insure their questions are answered and their concerns responded to. This could be similar to the Environment Canada (Section 2.1) annual, regional workshops, or as site-specific meetings with licensee employees that could be conducted less formally by AECB Inspectors when they are on-site. One most commendable example of this latter approach was observed at an exploration camp in northern Saskatchewan in 1984 when the AECB inspector provided an information discussion (in English and French) of the purpose and results of his inspection, as well as responding to questions. This was well received by all in attendance.

(b) Indirect communication through the company's safety committee. Employees and their representatives felt such committees should be a legislated requirement with set procedures and membership requirements. Such committees are generally

trusted to look impartially after the health and safety of employees. The typical employee would consult with either the company safety officer, his or her direct supervisor, or the safety committee if any questions or concerns on radiation safety arose.

(c) Educational programs were also recommended as a preferred method of direct communication with employees. Employees seem to envisage an interactive program, since this option was almost as highly rated for communication from the employee to the AECB, as in the opposite direction. Such programs would ideally be administered by a safety officer or safety committee with some background knowledge. They would be generally non-technical and have any technical sessions prepared on a job-specific basis (possibly for each of the major licence categories). Early sessions would explain AECB and its regulatory mandate, the AECB consultative process and how workers can become involved in this process or consult directly with AECB if questions or concerns arise.

In general, employees and their union or professional employee representatives felt that AECB should consult directly with employees.

Management representatives at licensed facilities had a number of additional recommendations to improve the AECB consultative process. They tended to be happier with the existing AECB program, and thus most recommendations were for improvements to this program rather than new approaches:

(a) It was suggested that consultative documents should be much less technical, or at least have a layman summary.

(b) Consultative documents should only be sent to industries which could be directly affected by their contents. This would alleviate much confusion and excess paperwork.

(c) A follow-up process (similar to the EPS Environmental Quality Update or the TDG Newsletter or Special Bulletins, see Section 2.3) was recommended to resolve the concern that arises when months or even years pass between notification of a proposed regulatory amendment and its actual passing.

In general, although management representatives receive AECB consultative documents, they seldom pass these on directly to employees. The reasons expressed for this include:

(a) the consultative documents are too preliminary; this raises concerns about changes which may never happen or may take years to put into effect;

(b) many of the consultative documents do not apply to their industry; workers may not realize this;

(c) the consultative documents are too technical; management prefers to have their technical experts review, summarize and simplify the information before passing it on; and

(d) many employers feel that it is their mandate to protect their employees, and thus direct contact between employees and regulators is not required.

Although, in most cases, management indicated that pertinent information was passed on, by them to employees, in a simplified form, there is no guarantee that this does occur in all cases. Many of the employees interviewed felt they were not kept totally informed in this manner. The best approach to ensure a more complete coverage of employees would be an expanded information network to include employee representatives. This is discussed in Recommendation 8.1(b).

8. RECOMMENDATIONS

Two types of recommendations are provided based on the surveys of employees, their union/professional association representatives, and management at licensed facilities across Canada as well as a review of public consultation programs utilized by various Federal Government agencies. The prime objective in the study was to determine the need for changes in AECB's public consultation program to optimize the awareness and participation of employees at licensed facilities. Thus, the first set of recommendations relates to the desires expressed by these employees and their representatives to be better informed. The second set of recommendations relates to the needs expressed by management. A third set of recommendations, though not based on expressed needs of employees or management, may help to improve the targeting of the consultation program. The recommendations, in general, apply to all licence categories included in this study. The optimal approaches, in some cases, might change with the licensee location, number of employees and union or professional association activity. Such decisions must be made on a case-specific basis.

8.1 Recommendations to Meet the Needs Expressed by Employees and Their Representatives

(a) When employees have concerns relating to radiation protection or regulatory changes, these are usually very job-specific and would require considerable reading to find answers in the literature. Many companies do not have safety committees and management with the technical background to understand the area of concern and employees may not, especially at times of labour strife, wish to rely entirely on management for information.

The best resolution of this problem would be through a mechanism of direct two-way communication between representatives of AECB and interested employees or their representatives (such as a safety committee including both management and employee representation). Suggested mechanisms would either be through regional workshops or employee meetings at each industrial location. Examples of such approaches, used by AECB and other Federal Agencies, are discussed in Section 2.1. The AECB representative could be either a public information specialist or the regional Inspector. A definite information program and perhaps training of the AECB representative in public consultation are advised, but the program should be informal in its presentation and maximize opportunities for two-way interaction

with the employees. Information sessions along these lines have recently been initiated by the Uranium Mines Division.

This type of program could be designed to mutually benefit AECB and workers in a number of ways:

(i) To educate workers on the responsibilities and public consultation mechanisms of AECB. Once workers know how to obtain specific information from AECB, they will be more apt to utilize and rely on existing AECB mechanisms such as the Office of Public Information, published reports, consultative documents and the AECB library.

(ii) To obtain feedback on regulatory initiatives. Most workers want their opinions to be considered, but many find the necessity to review technical documents and respond in writing difficult.

(iii) To obtain further feedback on the success of public consultation approaches.

(iv) To establish a better rapport between AECB and employees at licensed facilities as well as a relationship of trust.

(b) Many licensee employees wish more chances for consultation with AECB. This could be addressed with an expanded mailing of either the Notice of Issuance or Summary Report discussed above. Almost all employees of licensed facilities belong either to a union or a professional association. Notices of the availability of these summaries could be made through these organizations and possibly placed in newsletters. Employers could also be asked to cooperate by distributing such notices. Due to many employers indicating they did not agree with AECB efforts to keep employees informed, this latter may not be as successful. The media (through news releases or advertisements), schools and libraries could also be used to inform workers of the availability of this information service.

(c) A common wish of many employees at licensed facilities was to receive further training on radiation protection. While this is not necessarily AECB's responsibility, AECB could coordinate such a program with employers, unions or professional associations and safety committees, and provide the required

information or materials, while the company or employee representatives conduct the programs. The Uranium Mines Division currently offers this type of support for company programs. Materials supplied by AECB could include audio-visual materials, self-teaching computer programs, course instructions and background materials for those who do the teaching, course materials for the employees and some type of certification program for those who successfully complete the course.

8.2 Recommendations to Meet the Needs Expressed by Management

(a) The major complaints about the AECB consultative documents from those who do receive them regularly were that they are too technical, and they are often not relevant to the type of licence. A possible resolution would be a layman summary to accompany or replace the consultative document. These would need to be more extensive than the Notice of Issuance, covering topics such as the regulations affected, purpose and general aspects of the proposed amendments and the types of licensed facilities and/or jobs affected. The option could be given to those on the mailing list to receive either the summary alone or both documents. Those receiving the summary alone would have the option of requesting the consultative document later, if they wish.

(b) The lack of response to consultative documents often resulted from these being perceived as information sources alone as well as the reluctance of many to prepare formal written responses. Response questionnaire mail-back forms could be included with each consultative document to facilitate responses. This would have to include a notice that those who wish to submit more lengthy written responses are welcome to do so. A summary of these responses could be provided with the final regulatory document in the form of an analysis report.

(c) Management representatives at many licensed facilities expressed a desire for a follow-up process to resolve the concern that arises between notification of a proposed regulatory amendment and its actual passing. It is recommended that a regulatory journal or newsletter be issued on a regular basis to keep management informed about the status of proposed amendments, and that this periodical be less technical and more popular in style than the Regulatory Agenda.

(d) Reportedly the non-technical/non-ARW staff in many licensed facilities are most concerned over potential radiation hazards. Cleaning staff, secretaries and

workers from non-radiation areas often see radiation warning signs and immediately assume the worst. While this is not necessarily AECB's responsibility, special information notices could be prepared to explain the reason for posting such warnings, the low probability of problems occurring, and what actions to take or who to contact if concerns arise. Such notices could be made available to employers, unions and professional associations for distribution to such staff and to be posted adjacent to radiation warning signs.

8.3 Additional Recommendations to Improve Targeting of the Consultation Program

(a) Considerable confusion exists over the designation of Atomic Radiation Workers (ARW's). Some licensed facilities designate no ARW's. The reasoning is that since they have never had a worker exposed to radiation levels above the non-ARW limit, they assume that the probability for such exposures is non-existent. Others designated all workers, since they felt this was safer and easier to administrate. Quite a number of management and employees surveyed had no idea of what an ARW was nor how to designate them. AECB could rectify this situation by setting more specific regulations or guidelines on designation of ARW's. These should be based on the risk of exposure relevant to the different licence categories on an industry-wide basis. Greater uniformity in ARW designation would help to define an appropriate target population for consultation programs.

(b) Considerable confusion exists about licence categories. Some companies have six or seven different categories including a consolidated licence. The contacts identified by AECB often were only knowledgeable on one of those various licence types even though they were listed as contact for all of them. An updating, rationalization and consolidation of licence categories would facilitate the flow of information from AECB to appropriate licensee contacts.

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APPENDIX A

DETAILED QUESTIONNAIRE AND REVISIONS FOR SPECIFIC INDUSTRIES

Questionnaire and Number of Responses to Each Question.

Hello. We are researchers from Beak Consultants Limited. We are doing a survey for the Atomic Energy Control Board (AECB) to look at ways of improving channels of consultation between workers and the Board. May we have a few minutes of your time to answer some important questions? Your name and address are not required, and all information will be kept strictly confidential.

- Please take the time to think about the answers and, if you have any questions, ask one of our researchers.
- Please circle the appropriate response or write your answer in the space provided.

1. Have you previously heard of the Atomic Energy Control Board (also known as the AECB)? 524

yes no not sure

If yes, go to question 2; if no go to question 3.

2. Briefly describe, in your opinion, the function of the AECB.

_____ 543

_____

_____

3. Have you previously heard of Atomic Energy of Canada Ltd. (also known as AECL)? 487

yes no not sure

If yes, go to question 4; if no go to question 5.

4. Briefly describe, in your opinion, the function of AECL.

_____ 541

_____

_____

5. In your present job, do you, at any time, handle radioactive materials? 533

yes no not sure

6. Does your job require you to work, at any time, in a designated radiation area? 532

yes no not sure

7. Have you been designated by your employer as an Atomic Radiation Worker (A.R.W.)? (The AECB requires the employer to designate all workers who have a reasonable probability of receiving a 5 millisievert (500 mrem) radiation dose or more per year.) 486

yes no not sure

8. How many years have you been working?

For your present employer _____ 527

As an Atomic Radiation Worker _____ 495

9. How safe do you feel you are at work, from injury, illness or death due to radiation? 540

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

10. How safe do you feel you are at work from injury, illness, or death from all other hazards? 541

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

11. If you wanted to find out some information about radiation health and safety on your job, who would you most likely contact? (please circle one response only) 542

1. radiation safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

12. If you wanted to find out some information about health and safety on your job not related to radiation, who would you most likely contact? (please circle one response only. 541

1. safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

13. Approximately how many times have you contacted the AECB to express an opinion concerning board regulations, policies or guidelines by writing, telephoning, or attending a meeting with a representative of the AECB? 533

No. of Times _____

14. Approximately how many times have you received a notice or consultative document directly from the AECB or through your employer concerning board regulations, policies or guidelines? 487

No. of Times

15. Approximately how many times have you read an article or press release (originating from AECB) concerning AECB regulations, policies or guidelines in a journal, magazine or newspaper? 457

No. of Times _____

16. To what degree do you feel that employees should be consulted by the AECB before regulations or license conditions concerning radiation health and safety are made? 525

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

17. To what degree do you feel that employees should be consulted by those in authority before regulations are made that concern other types of occupational health and safety (other than radiation)? 535

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

18. Would you like to be more active than you are at present in the AECB's process of forming regulations or license conditions concerning radiation health and safety? 448

yes	no	not sure

19. To what extent has the AECB done a good job in providing information to you and finding out employees' opinions regarding radiation health and safety? 456

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

20. In general, to what extent have other agencies, government departments, and safety associations done a good job in providing you with information and finding out your opinions concerning other types of occupational health and safety regulations? 496

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

The following questions list possible public consultation methods which could be used either by the AECB directly, or by employers, unions or professional associations. Please rate each one according to how well the method would provide information to you from the AECB, and how well it would provide an opportunity for you to express your opinion to the AECB. The scale is from 1 to 10, with 10 being excellent and 1 very poor. Please read them all over first before starting.

	provide information to you	express your opinion to the AECB
21. Public Meeting: Open meetings followed by a question period to gauge worker reaction.	515	501
22. News Releases: Information summary intended for news media use (newspapers, radio, TV).	520	457
23. Workshops: Formal presentation of information followed by active discussion in small groups.	521	497
24. Open Houses: Displays and information summaries accompanied by personnel capable of discussing them.	517	492
25. Newsletters: Periodic information summaries mailed to you from a mailing list.	521	457
26. Surveys: Questionnaires provided to you, then collected and analysed.	494	501
27. Safety Committee: Employer, worker (or union) and AECB representatives who meet periodically to review, comment and provide recommendations.	518	501
28. Expert Opinion: Surveys of individuals with accepted expertise on topic to gauge reactions and solicit recommendations (inspectors, scientists).	506	491
29. Public Reports: Technical reports either released directly to public requesting them or through libraries. After reading, people can write a letter to express their opinion if they wish.	513	486
30. Special Interest Group Seminars: Presentations to special interest groups. These will usually include presentations with the group's viewpoint in mind.	519	493
31. Posters: Information presented in display window or poster format in the work area.	516	455
32. Information Offices: Open office and telephone available for worker questions or expressions of opinion (drop-in centre and/or hot line).	514	496
33. Media Advertisements: Advertisements in newspapers, radio, or television to inform workers.	517	461
34. Educational Programs: Films, slide shows, workbooks, and discussion at an organized worker meeting.	521	481

35. If you can suggest a superior process not mentioned above, please describe it briefly on the following lines: 543

_____

_____

36. Do you belong to a union? 492

yes no not sure

37. If yes, which one? _____

38. Have you ever discussed AECB regulations with a union representative or inspector or at union meetings, or have you ever read about AECB regulations in a union magazine or newsletter? 446

yes no not sure

39. To what extent do you feel unions should be involved in the AECB's public consultation process? 438

constant input	a lot of input	some input	a little input	none at all	not sure
1	2	3	4	5	6

40. Do you belong to any professional association? 408

yes no not sure

41. If yes, which one(s)? _____

_____

42. Have you ever read about AECB regulations or license conditions in your association's magazine or newsletter, or have you ever been contacted by your association in regards to an AECB regulation? 363

yes no not sure

43. To what extent do you feel professional associations should be involved in the AECB's public consultation process? 362

constant input	a lot of input	some input	a little input	none at all	not sure
1	2	3	4	5	6

Now I am going to ask you some personal questions about yourself. All the information you provide will be kept confidential and your name will not be needed with any of this information.

44. What is your age: _____ years 527

45. Sex male female 525

46. What is the extent of your formal education? (please circle) 525

1. Public School
2. Secondary School
3. Community College
4. University
5. No formal education

47. Which of the following categories best describe the combined total annual income (before taxes) of all the members of your household? 507

1. under $10,000
2. $10,000 - $20,000
3. $20,000 - $30,000
4. $30,000 - $40,000
5. $40,000 or more

Revised Questionnaire for Some Reactor Facilities

Hello. We are researchers from Beak Consultants Limited. We are doing a survey for the Atomic Energy Control Board (AECB) to look at ways of improving channels of consultation between workers and the Board. May we have a few minutes of your time to answer some important questions? Your name and address are not required, and all information will be kept strictly confidential.

- Please take the time to think about the answers and, if you have any questions, ask one of our researchers.
- Please circle the appropriate response or write your answer in the space provided.

1. Have you previously heard of the Atomic Energy Control Board (also known as the AECB)?

yes no not sure

If yes, go to question 2; if no go to question 3.

2. Briefly describe, in your opinion, the function of the AECB.

_____

_____

_____

3. Have you previously heard of Atomic Energy of Canada Ltd. (also known as AECL)?

yes no not sure

If yes, go to question 4; if no go to question 5.

4. Briefly describe, in your opinion, the function of AECL.

_____

_____

_____

5. In your present job, do you, at any time, handle radioactive materials?

yes no not sure

6. Does your job require you to work, at any time, in a designated radiation area?

yes no not sure

7. Have you been designated by your employer as an Atomic Radiation Worker (A.R.W.)? (The AECB requires the employer to designate all workers who have a reasonable probability of receiving a 5 millisievert (500 mrem) radiation dose or more per year.)

yes no not sure

8. How many years have you been working?

For your present employer _____

As an Atomic Radiation Worker _____

9. How safe do you feel you are at work, from injury, illness or death due to radiation?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

10. How safe do you feel you are at work from injury, illness, or death from all other hazards?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

11. If you wanted to find out some information about radiation health and safety on your job, who would you most likely contact? (please circle one response only)

1. radiation safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

12. If you wanted to find out some information about health and safety on your job not related to radiation, who would you most likely contact? (please circle one response only.

1. safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

13. Approximately how many times have you contacted the AECB to express an opinion concerning board regulations, policies or guidelines by writing, telephoning, or attending a meeting with a representative of the AECB?

No. of Times _____

14. Approximately how many times have you received or been made aware of a notice or consultative document directly from the AECB or through your employer concerning board regulations, policies or guidelines?

No. of Times _____

15. Approximately how many times have you read an article or press release (originating from AECB) concerning AECB regulations, policies or guidelines in a journal, magazine or newspaper?

No. of Times _____

16. To what degree do you feel that employees should be consulted by the AECB before regulations or license conditions concerning radiation health and safety are made?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

17. To what degree do you feel that employees should be consulted by regulatory agencies before regulations are made that concern other types of occupational health and safety (other than radiation)?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

18. Would you like to be more active than you are at present in the AECB's process of forming regulations or license conditions concerning radiation health and safety?

yes	no	not sure

19. To what extent has the AECB done a good job in providing information to employer/employee and finding out employees' opinions regarding radiation health and safety?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

20. In general, to what extent have other agencies, government departments, and safety associations done a good job in providing you with information and finding out your opinions concerning other types of occupational health and safety regulations?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

The following questions list possible public consultation methods which could be used either by the AECB directly, or by employers, unions or professional associations. Please rate each one according to how well the method would provide information to you from the AECB, and how well it would provide an opportunity for you to express your opinion to the AECB. The scale is from 1 to 10, with 10 being excellent and 1 very poor. Please read them all over first before starting.

	provide information to you	express your opinion to the AECB
21. Public Meeting: Open meetings followed by a question period to gauge worker reaction.	____	____
22. News Releases: Information summary intended for news media use (newspapers, radio, TV).	____	____
23. Workshops: Formal presentation of information followed by active discussion in small groups.	____	____
24. Open Houses: Displays and information summaries accompanied by personnel capable of discussing them.	____	____
25. Newsletters: Periodic information summaries mailed to you from a mailing list.	____	____
26. Surveys: Questionnaires provided to you, then collected and analysed.	____	____
27. Safety Committee: Employer, worker (or union) and AECB representatives who meet periodically to review, comment and provide recommendations.	____	____
28. Expert Opinion: Surveys of individuals with accepted expertise on topic to gauge reactions and solicit recommendations (inspectors, scientists).	____	____
29. Public Reports: Technical reports either released directly to public requesting them or through libraries. After reading, people can write a letter to express their opinion if they wish.	____	____
30. Special Interest Group Seminars: Presentations to special interest groups. These will usually include presentations with the group's viewpoint in mind.	____	____
31. Posters: Information presented in display window or poster format in the work area.	____	____
32. Information Offices: Open office and telephone available for worker questions or expressions of opinion (drop-in centre and/or hot line).	____	____
33. Media Advertisements: Advertisements in newspapers, radio, or television to inform workers.	____	____
34. Educational Programs: Films, slide shows, workbooks, and discussion at an organized worker meeting.	____	____

33. If you can suggest a superior process not mentioned above, please describe it briefly on the following lines:

_____

_____

36. Do you belong to a union?

yes no not sure

37. If yes, which one? _____

38. Have you ever discussed AECB regulations with a union representative or inspector or at union meetings, or have you ever read about AECB regulations in a union magazine or newsletter?

yes no not sure

39. To what extent do you feel unions should be involved in the AECB's public consultation process?

constant input	a lot of input	some input	a little input	none at all	not sure
1	2	3	4	5	6

40. Do you belong to any professional association (such as *) or corporate association (such as *)?

yes no not sure

41. If yes, which one(s)? _____

_____

42. Have you ever read about AECB regulations or license conditions in your association's magazine or newsletter, or have you ever been contacted by your association in regards to an AECB regulation?

yes no not sure

43. To what extent do you feel professional associations should be involved in the AECB's public consultation process?

constant input	a lot of input	some input	a little input	none at all	not sure
1	2	3	4	5	6

Now I am going to ask you some personal questions about yourself. All the information you provide will be kept confidential and your name will not be needed with any of this information.

44. What is your age: _____ years

45. Sex: male female

46. What is the extent of your formal education? (please circle)

1. Public School
2. Secondary School
3. Community College
4. University
5. No formal education

47. Which of the following categories best describe the combined total annual income (before taxes) of all the members of your household?

1. under $10,000
2. $10,000 - $20,000
3. $20,000 - $30,000
4. $30,000 - $40,000
5. $40,000 or more

* Name Deleted

Revised Questionnaire for a Heavy Water Plant

Hello. We are researchers from Beak Consultants Limited. We are doing a survey for the Atomic Energy Control Board (AECB) to look at ways of improving channels of consultation between workers and the Board. May we have a few minutes of your time to answer some important questions? Your name and address are not required, and all information will be kept strictly confidential.

- Please take the time to think about the answers and, if you have any questions, ask one of our researchers.
- Please circle the appropriate response or write your answer in the space provided.

1. Have you previously heard of the Atomic Energy Control Board (also known as the AECB)?

yes no not sure

If yes, go to question 2; if no go to question 3.

2. Briefly describe, in your opinion, the function of the AECB.

_____

_____

_____

3. Have you previously heard of Atomic Energy of Canada Ltd. (also known as AECL)?

yes no not sure

If yes, go to question 4; if no go to question 5.

4. Briefly describe, in your opinion, the function of AECL.

_____

_____

_____

5. In your present job, do you, at any time, handle radioactive materials?

yes no not sure

6. Does your job require you to work, at any time, in an H_2S buddy area?

yes no not sure

7. Have you been designated by your employer as an Atomic Radiation Worker (A.R.W.)? (The AECB requires the employer to designate all workers who have a reasonable probability of receiving a 5 millisievert (500 mrem) radiation dose or more per year.)

yes no not sure

8. How many years have you been working?

For your present employer _____

As an Atomic Radiation Worker _____

9. How safe do you feel you are at work, from injury, illness or death due to H_2S poisoning?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

10. How safe do you feel you are at work from injury, illness, or death from all other hazards?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

11. If you wanted to find out some information about chemical (e.g., H_2S) health and safety on your job, who would you most likely contact? (please circle one response only)

1. safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

12. If you wanted to find out some information about health and safety on your job not related to H_2S, who would you most likely contact? (please circle one response only.

1. safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

13. Approximately how many times have you contacted the AECB to express an opinion concerning board regulations, policies or guidelines by writing, telephoning, or attending a meeting with a representative of the AECB?

No. of Times _____

14. Approximately how many times have you received or been made aware of a notice or consultative document directly from the AECB or through your employer concerning board regulations, policies or guidelines?

No. of Times _____

15. Approximately how many times have you read an article or press release (originating from AECB) concerning AECB regulations, policies or guidelines in a journal, magazine or newspaper?

No. of Times _____

16. To what degree do you feel that employees should be consulted by the AECB before regulations or license conditions concerning chemical (e.g., H_2S) health and safety are made?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

17. To what degree do you feel that employees should be consulted by regulatory agencies before regulations are made that concern other types of occupational health and safety (other than H_2S)?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

18. Would you like to be more active than you are at present in the AECB's process of forming regulations or license conditions concerning chemical (e.g., H_2S) health and safety?

yes	no	not sure

19. To what extent has the AECB done a good job in providing information to employer/employee and finding out employees' opinions regarding chemical (e.g., H_2S) health and safety?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

20. In general, to what extent have other agencies, government departments, and safety associations done a good job in providing you with information and finding out your opinions concerning other types of occupational health and safety regulations?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

The following questions list possible public consultation methods which could be used either by the AECB directly, or by employers, unions or professional associations. Please rate each one according to how well the method would provide information to you from the AECB, and how well it would provide an opportunity for you to express your opinion to the AECB. The scale is from 1 to 10, with 10 being excellent and 1 very poor. Please read them all over first before starting.

	provide information to you	express your opinion to the AECB
21. Public Meeting: Open meetings followed by a question period to gauge worker reaction.	___	___
22. News Releases: Information summary intended for news media use (newspapers, radio, TV).	___	___
23. Workshops: Formal presentation of information followed by active discussion in small groups.	___	___
24. Open Houses: Displays and information summaries accompanied by personnel capable of discussing them.	___	___
25. Newsletters: Periodic information summaries mailed to you from a mailing list.	___	___
26. Surveys: Questionnaires provided to you, then collected and analysed.	___	___
27. Safety Committee: Employer, worker (or union) and AECB representatives who meet periodically to review, comment and provide recommendations.	___	___
28. Expert Opinion: Surveys of individuals with accepted expertise on topic to gauge reactions and solicit recommendations (inspectors, scientists).	___	___
29. Public Reports: Technical reports either released directly to public requesting them or through libraries. After reading, people can write a letter to express their opinion if they wish.	___	___
30. Special Interest Group Seminars: Presentations to special interest groups. These will usually include presentations with the group's viewpoint in mind.	___	___
31. Posters: Information presented in display window or poster format in the work area.	___	___
32. Information Offices: Open office and telephone available for worker questions or expressions of opinion (drop-in centre and/or hot line).	___	___
33. Media Advertisement: Advertisements in newspapers, radio, or television to inform workers.	___	___
34. Educational Programs: Films, slide shows, workbooks, and discussion at an organized worker meeting.	___	___

35. If you can suggest a superior process not mentioned above, please describe it briefly on the following lines:

_____

_____

36. Do you belong to a union?

yes no not sure

37. If yes, which one? _____

38. Have you ever discussed AECB regulations with a union representative or inspector or at union meetings, or have you ever read about AECB regulations in a union magazine or newsletter?

yes no not sure

39. To what extent do you feel unions should be involved in the AECB's public consultation process?

constant input	a lot of input	some input	a little input	none at all	not sure
1	2	3	4	5	6

40. Do you belong to any professional association (such as ★) or corporate association (such as ★)?

yes no not sure

41. If yes, which one(s)? _____

_____

42. Have you ever read about AECB regulations or license conditions in your association's magazine or newsletter, or have you ever been contacted by your association in regards to an AECB regulation?

yes no not sure

43. To what extent do you feel professional associations should be involved in the AECB's public consultation process?

constant input	a lot of input	some input	a little input	none at all	not sure
1	2	3	4	5	6

Now I am going to ask you some personal questions about yourself. All the information you provide will be kept confidential and your name will not be needed with any of this information.

44. What is your age: _____ years

45. Sex: male female

46. What is the extent of your formal education? (please circle)

1. Public School
2. Secondary School
3. Community College
4. University
5. No formal education

47. Which of the following categories best describe the combined total annual income (before taxes) of all the members of your household?

1. under $10,000
2. $10,000 - $20,000
3. $20,000 - $30,000
4. $30,000 - $40,000
5. $40,000 or more

★ Name Deleted

Revised Questionnaire for a Unionized Mine

Hello. We are researchers from Beak Consultants Limited. We are doing a survey for the Atomic Energy Control Board (AECB) to look at ways of improving channels of consultation between workers and the Board. May we have a few minutes of your time to answer some important questions? Your name and address are not required, and all information will be kept strictly confidential.

- Please take the time to think about the answers and, if you have any questions, ask one of our researchers.
- Please circle the appropriate response or write your answer in the space provided.

1. Have you previously heard of the Atomic Energy Control Board (also known as the AECB)?

yes no not sure

If yes, go to question 2; if no go to question 3.

2. Briefly describe, in your opinion, the function of the AECB.

_____

_____

_____

3. Have you previously heard of Atomic Energy of Canada Ltd. (also known as AECL)?

yes no not sure

If yes, go to question 4; if no go to question 5.

4. Briefly describe, in your opinion, the function of AECL.

_____

_____

_____

5. In your present job, do you, at any time, handle radioactive materials?

yes no not sure

6. Does your job require you to work, at any time, in a designated radiation area?

yes no not sure

7. Have you been designated by your employer as an Atomic Radiation Worker (A.R.W.)? (The AECB requires the employer to designate all workers who have a reasonable probability of receiving a 5 millisievert (500 mrem) radiation dose or more per year.)

yes no not sure

8. How many years have you been working?

For your present employer _____

As an Atomic Radiation Worker _____

9. How safe do you feel you are at work, from injury, illness or death due to radiation?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

10. How safe do you feel you are at work from injury, illness, or death from all other hazards?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

11. If you wanted to find out some information about radiation health and safety on your job, who would you most likely contact? (please circle one response only)

1. radiation safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

12. If you wanted to find out some information about health and safety on your job not related to radiation, who would you most likely contact? (please circle one response only.

1. safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. union or professional association
7. Ministry of Labour (provincial)
8. Labour Canada
9. Workers' Compensation Board
10. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
11. expert (i.e., professor)
12. doctor
13. not sure
14. other (please specify) _____

13. Approximately how many times have you contacted the AECB to express an opinion concerning board regulations, policies or guidelines by writing, telephoning, or attending a meeting with a representative of the AECB?

No. of Times _____

14. Approximately how many times have you received a notice or consultative document directly from the AECB or through your employer concerning board regulations, policies or guidelines?

No. of Times _____

15. Approximately how many times have you read an article or press release (originating from AECB) concerning AECB regulations, policies or guidelines in a journal, magazine or newspaper?

No. of Times _____

16. To what degree do you feel that employees should be consulted by the AECB before regulations or license conditions concerning radiation health and safety are made?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

17. To what degree do you feel that employees should be consulted by those in authority before regulations are made that concern other types of occupational health and safety (other than radiation)?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

18. Would you like to be more active than you are at present in the AECB's process of forming regulations or license conditions concerning radiation health and safety?

yes no not sure

19. To what extent has the AECB done a good job in providing information to you and finding out employees' opinions regarding radiation health and safety?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

20. In general, to what extent have other agencies, government departments, and safety associations done a good job in providing you with information and finding out your opinions concerning other types of occupational health and safety regulations?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

The following questions list possible public consultation methods which could be used either by the AECB directly, or by employers, unions or professional associations. Please rate each one according to how well the method would provide information to you from the AECB, and how well it would provide an opportunity for you to express your opinion to the AECB. The scale is from 1 to 10, with 10 being excellent and 1 very poor. Please read them all over first before starting.

	provide information to you	express your opinion to the AECB
21. Public Meeting: Open meetings followed by a question period to gauge worker reaction.	____	____
22. News Releases: Information summary intended for news media use (newspapers, radio, TV).	____	____
23. Workshops: Formal presentation of information followed by active discussion in small groups.	____	____
24. Open Houses: Displays and information summaries accompanied by personnel capable of discussing them.	____	____
25. Newsletters: Periodic information summaries mailed to you from a mailing list.	____	____
26. Surveys: Questionnaires provided to you, then collected and analysed.	____	____
27. Safety Committee: Employer, worker (or union) and AECB representatives who meet periodically to review, comment and provide recommendations.	____	____
28. Expert Opinion: Surveys of individuals with accepted expertise on topic to gauge reactions and solicit recommendations (inspectors, scientists).	____	____
29. Public Reports: Technical reports either released directly to public requesting them or through libraries. After reading, people can write a letter to express their opinion if they wish.	____	____
30. Special Interest Group Seminars: Presentations to special interest groups. These will usually include presentations with the group's viewpoint in mind.	____	____
31. Posters: Information presented in display window or poster format in the work area.	____	____
32. Information Offices: Open office and telephone available for worker questions or expressions of opinion (drop-in centre and/or hot line).	____	____
33. Media Advertisement: Advertisements in newspapers, radio, or television to inform workers.	____	____
34. Educational Programs: Films, slide shows, workbooks, and discussion at an organized worker meeting.	____	____

35. If you can suggest a superior process not mentioned above, please describe it briefly on the following lines:

_____

_____

36. Do you belong to any professional association?

yes no not sure

37. If yes, which one(s)? _____

_____

38. Have you ever read about AECB regulations or license conditions in your association's magazine or newsletter, or have you ever been contacted by your association in regards to an AECB regulation?

yes no not sure

39. To what extent do you feel professional associations should be involved in the AECB's public consultation process?

constant input	a lot of input	some input	a little input	none at all	not sure
1 2	3	4	5	6	

Now I am going to ask you some personal questions about yourself. All the information you provide will be kept confidential and your name will not be needed with any of this information.

40. What is your age: _____ years

41. Sex: male female

42. What is the extent of your formal education? (please circle)

1. Public School
2. Secondary School
3. Community College
4. University
5. No formal education

43. Which of the following categories best describe the combined total annual income (*before* taxes) of all the members of your household?

1. under $10,000
2. $10,000 - $20,000
3. $20,000 - $30,000
4. $30,000 - $40,000
5. $40,000 or more

Revised Questionnaire for a Non-Unionized Mine

Researchers from Beak Consultants Limited are doing a survey for the Atomic Energy Control Board (AECB) to look at ways of improving channels of consultation between workers and the Board. We would like to take a few minutes of your time to answer some important questions. Your name and address are not required, and all information will be kept strictly confidential.

- Please take the time to think about the answers and, if you have any questions, do not hesitate to ask for an explanation.
- Please circle your response or write your answer in the space provided.

1. Have you previously heard of the Atomic Energy Control Board (also known as the AECB)?

yes no not sure

if yes, go to question 2; if no go to question 3.

2. Briefly describe, in your opinion, the function of the AECB.

_____

_____

_____

3. Have you previously heard of Atomic Energy of Canada Ltd. (also known as AECL)?

yes no not sure

if yes, go to question 4; if no go to question 5.

4. Briefly describe, in your opinion, the function of AECL.

_____

_____

_____

5. In your present job, do you, at any time, handle radioactive materials (e.g., uranium-bearing ore, yellowcake)?

yes no not sure

6. Does your job require you to work, at any time, in a designated radiation area?

yes no not sure

7. Have you been designated by your employer as an Atomic Radiation Worker (A.R.W.)? (The AECB requires the employer to designate all workers who have a reasonable probability of receiving a 5 millisievert (500 mrem) radiation dose or more per year.)

yes no not sure

8. How many years have you been working?

For your present employer _____

As an Atomic Radiation Worker _____

9. How safe do you feel you are at work, from injury, illness or death due to radiation?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

10. How safe do you feel you are at work from injury, illness, or death from all other hazards?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

11. If you wanted to find out some information about radiation health and safety on your job, who would you most likely contact? (please circle one response only)

1. radiation safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. Ministry of Labour (provincial)
7. Labour Canada
8. Workers' Compensation Board
9. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
10. expert (i.e., professor)
11. doctor
12. not sure
13. other (please specify) _____

12. If you wanted to find out some information about health and safety on your job not related to radiation, who would you most likely contact? (please circle one response only.

1. safety officer
2. safety committee
3. supervisor
4. Atomic Energy Control Board representative
5. friend
6. Ministry of Labour (provincial)
7. Labour Canada
8. Workers' Compensation Board
9. safety association (i.e., Industrial Accident Prevention Association, or Canadian Institute for Radiation Safety)
10. expert (i.e., professor)
11. doctor
12. not sure
13. other (please specify) _____

13. Approximately how many times have you contacted the AECB to express an opinion concerning board regulations, policies or guidelines by writing, telephoning, or attending a meeting with a representative of the AECB?

No. of Times _____

14. Approximately how many times have you received or been made aware of a notice or proposed regulatory document directly from the AECB or through your employer concerning changes that are being considered to board regulations, policies or guidelines?

No. of Times _____

15. Approximately how many times have you read an article or press release (originating from AECB) concerning AECB regulations, policies or guidelines in a journal, magazine or newspaper?

No. of Times _____

16. To what degree do you feel that employees should be consulted by the AECB before regulations or license conditions concerning radiation health and safety are made?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

17. To what degree do you feel that employees should be consulted by provincial or federal regulatory agencies before regulations are made that concern other types of occupational health and safety (other than radiation)?

constantly	a lot	some	a little	none	not sure
1	2	3	4	5	6

18. Would you like to be more active than you are at present in the AECB's process of forming regulations or license conditions concerning radiation health and safety?

yes	no	not sure

19. To what extent has the AECB done a good job in providing information to you and finding out employees' opinions regarding radiation health and safety?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

20. In general, to what extent have other agencies, government departments, and safety associations done a good job in providing you with information and finding out your opinions concerning other types of occupational health and safety regulations?

very good	fairly good	adequate	fairly poor	very poor	not sure
1	2	3	4	5	6

The following questions list possible public consultation methods which could be used either by the AECB directly, or by employers. Please rate each one according to how well the method would provide information to you from the AECB, and how well it would provide an opportunity for you to express your opinion to the AECB. The scale is from 1 to 10, with 10 being excellent and 1 very poor. Please read them all over first before starting.

	provide information to you	express your opinion to the AECB
21. Public Meeting: Open meetings followed by a question period to gauge worker reaction.	___	___
22. News Releases: Information summary intended for news media use (newspapers, radio, TV).	___	___
23. Workshops: Formal presentation of information followed by active discussion in small groups.	___	___
24. Open Houses: Displays and information summaries accompanied by personnel capable of discussing them.	___	___
25. Newsletters: Periodic information summaries mailed to you from a mailing list.	___	___
26. Surveys: Questionnaires provided to you, then collected and analysed.	___	___
27. Safety Committee: Employer, worker, and AECB representatives who meet periodically to review, comment and provide recommendations.	___	___
28. Expert Opinion: Surveys of individuals with accepted expertise on a topic to gauge reactions and ask for recommendations (inspectors, scientists).	___	___
29. Public Reports: Technical reports made available to the public either directly by request or through libraries. After reading, people can write a letter to express their opinion if they wish.	___	___
30. Special Interest Group Seminars: Presentations to special interest groups. These will usually include presentations with the group's viewpoint in mind.	___	___
31. Posters: Information presented in display window or poster format in the work area.	___	___
32. Information Offices: Open office and telephone line available for worker questions or expressions of opinion (drop-in centre and/or hot line).	___	___
33. Media Advertisement: Advertisements in newspapers, radio, or television to inform workers.	___	___
34. Educational Programs: Films, slide shows, workbooks, and discussion at an organized worker meeting.	___	___

35. If you can suggest a better process not mentioned above, please describe it briefly on the following lines:

_____

_____

Now I am going to ask you some personal questions about yourself. All the information you provide will be kept confidential and your name will not be needed with any of this information.

36. What is your age: _____ years

37. Sex: male female

38. What is the extent of your formal education? (please circle)

1. Public School
2. Secondary School
3. Community College
4. University
5. No formal education

39. Which of the following categories best describe the combined total annual income (before taxes) of all the members of your household?

1. under $10,000
2. $10,000 - $20,000
3. $20,000 - $30,000
4. $30,000 - $40,000
5. $40,000 or more

Pretest Questionnaire

Hello my name is _____ and I am from Beak Consultants Limited. I am doing a survey for the Atomic Energy Control Board. May I have a few minutes of your time to answer some important questions? Your name and address are not required and all information you give will be strictly confidential. (Please circle the appropriate response.)

1. Have you ever heard of the Atomic Energy Control Board (also known as the AECB)?

yes no not sure

if yes, go to question 2; if no go to question 3.

2. Briefly describe, in your opinion, the function of the AECB.

_____

_____

_____

3. In your present job, do you, at any time, handle radioactive materials?

yes no not sure

4. Does your job require you to work, at any time, in a designated radiation area?

yes no not sure

5. Have you been designated by your employer as an Atomic Radiation Worker (A.R.W.)? (The AECB requires the employer to designate all workers who have a reasonable probability of receiving a 5 milisievert radiation dose or more per year.)

yes no not sure

6. How safe do you feel you are at work, from injury, illness or death due to radiation?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

7. How safe do you feel you are at work from injury, illness, or death from all other hazards?

very safe	fairly safe	average	moderately unsafe	not safe at all
1	2	3	4	5

8. If you wanted to find out some information about radiation health and safety on your job who would you contact (position, not name)?

_____

9. If you wanted to find out some information about health and safety on your job not related to radiation, who would you contact?

_____

The Atomic Energy Control Board provides information to the public in various ways. I will now read a list of different methods they use. If you have ever had contact with the AECB through any of these methods either directly or indirectly, answer yes, or no. If yes, approximately how may times? (please check)

	yes	no	approximate no. of times
10. Have you ever written the AECB a letter?	____	____	____
11. Have you ever telephoned the AECB?	____	____	____
12. Have you ever attended a meeting with a representative of the AECB?	____	____	____
13. Have you ever received AECB newsletters in the mail or from your employer?	____	____	____
14. Have you ever read a news release from the AECB in a newspaper, magazine, or journal?	____	____	____
15. Have you ever read the AECB's Regulatory Agenda in the Canada Gazette?	____	____	____
16. Have you ever read the AECB's Quarterly Summary of Reported Incidents?	____	____	____
17. Have you ever read the AECB's magazine "Control"?	____	____	____

18. In your opinion do you feel that you and other employees should be consulted by the AECB before regulations concerning radiation health and safety are made?

yes no not sure

19. Why? _____

20. Would you like to be more active in participating in in the AECB's process of forming regulations concerning radiation health and safety?

yes no not sure

21. Do you feel that you and other employees should be consulted by those in authority before regulations are made that concern other types of occupational health and safety (other than radiation)?

yes no not sure

22. Why? _____

23. In your opinion, what is the best way for the AECB to get in touch with you to find out your opinions regarding existing radiation health and safety?

_____

_____

24. In your opinion, what is the best way for the AECB to provide information to you concerning existing or proposed radiation health and safety regulations?

_____

_____

25. In your opinion, has the AECB done a good job in providing information to you and finding out employees' opinions regarding radiation health and safety?

yes no not sure

26. Why? _____

_____

_____

27. In general, have other agenices, government departments, and safety associations done a good job in providing you with information and finding out your opinions concerning other types of occupational health and safety regulations?

yes no not sure

28. Why? _____

Now I am going to read a list of possible public consultation methods and I would like you to rate each one according to how well the method would provide information to you from the AECB, and how well it would provide an opportunity for you to express your opinion to the AECB. The scale is from 1 to 10, with 10 being the best and 1 the worst.

	provide information to you	express your opinion to the AECB
29. Public Meeting: Open meetings followed by a question period to gauge worker reaction.	___	___
30. News Releases: Information summary intended for news media use (newspapers, radio, TV).	___	___
31. Workshops: Formal presentation of information followed by active discussion in small groups.	___	___

	provide information to you	express your opinion to the AECB
32. Open Houses: Displays and information summaries accompanied by personnel capable of discussing them.	___	___
33. Newsletters: Periodic information summaries mailed to you from a mailing list.	___	___
34. Surveys: Questionnaires provided to you, then collected and analysed.	___	___
35. Safety Committee: Employer, worker and AECB representatives who meet periodically to review, comment and provide recommendations.	___	___
36. Expert Opinion: Surveys of individuals with accepted expertise on topic to gauge reactions and solicit recommendations.	___	___
37. Public Reports: Technical reports either released directly to public requesting them or through libraries. After reading, people can write a letter to express their opinion if they wish.	___	___
38. Special Interest Group Seminars: Presentations to special interest groups. These will usually include presentations with the group's viewpoint in mind.	___	___
39. Posters: Information presented in display window or poster format in the work area.	___	___
40. Information Offices: Open office and telephone available for worker questions or expressions of opinion (drop-in centre and/or hot line).	___	___
41. Media Advertisement: Advertisements in newspapers, radio, or television to inform workers.	___	___
42. Educational Programs: Films, slide shows, workbooks, and discussion at an organized worker meeting.	___	___

43. Do you belong to a union?

yes no not sure

(If no, go to Question 49)

44. If yes, which one? _____, not sure ___

45. Do you attend union meetings?

all the time	often	sometimes	rarely	not at all
1	2	3	4	5

46. Have you ever discussed AECB regulations with your union representative or at union meetings?

yes no not sure

47. Have you ever read about AECB regulations in a union magazine or newsletter?

yes no not sure

48. What role do you feel unions have in the AECB's public consultation process?

_____
_____
_____
_____

49. Do you belong to a professional association?

yes no not sure

(If no, go to Question 55)

50. If yes, which ones? _____, not sure ___

51. Have you ever read about AECB regulations in your association's magazine or newsletter?

yes no not sure

52. Have you ever been contacted by your association in regards to an AECB regulation?

yes no not sure

53. If yes (to Question 52), by what means? _____
_____

54. What role do you feel your association should have in AECB's public consultation process? _____
_____

Now I am going to ask you some personal questions about yourself. All the information you provide will be kept confidential and your name will not be needed with any of this information.

55. What is your age: ____ years

Or if you prefer, are you? (please circle)

18-24
25-34
35-44
45-54
55-64
65 or more

56. Sex: male
female

57. What is the extent of your formal education? (please check)

Partial	Completed	
____	____	Public School
____	____	Secondary School
____	____	Community College
____	____	University - bachelors level
____	____	- graduate level
____	____	No formal education
____	____	Refused

58. Which of the following categories best describe the combined total annual income (before taxes) of all the members of your household?

____ under $10,000
____ $10,000 - $20,000
____ $20,000 - $30,000
____ $30,000 - $40,000
____ $40,000 or more
____ Don't know
____ Refused

59. Now that we have completed the survey, is there anything you would like to add or say about the Atomic Energy Control Board, public consultation, or this survey?

_____
_____
_____
_____
_____
_____

Thank you for your cooperation.

60. Interviewer's Comments: After completion of interview, respondents degree of participation:

____ very hostile
____ somewhat hostile
____ neutral
____ somewhat cooperative
____ very cooperative

61. Comments: _____

_____

_____

APPENDIX B

DETAILED QUESTIONNAIRE RESPONSES BY LICENCE CATEGORY

Summaries of V1
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		1.0687	.2532	524
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	1.2593	.4466	27
CAT	CONSOL	1.3793	.4938	29
CAT	CONSPRO	1.1818	.4045	11
CAT	FUEL	1.0000	0.0	33
CAT	GUAGES	1.1053	.3153	19
CAT	HUMOPS	1.1290	.3408	31
CAT	HVYWAT	1.0000	0.0	50
CAT	IRAD	1.0000	0.0	3
CAT	LOGGING	1.0000	0.0	2
CAT	MINEK	1.0484	.2163	62
CAT	MINER	1.0645	.2497	31
CAT	MINEXR	1.0909	.3015	11
CAT	RADGFY	1.0000	0.0	8
CAT	REACTOR	1.0103	.1015	97
CAT	REACTORB	1.0000	0.0	51
CAT	REACTORP	1.0000	0.0	44
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	1.2500	.4523	12

Summaries of V2
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		1.1971	.3981	543
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	1.4194	.5016	31
CAT	CONSOL	1.5455	.5056	33
CAT	CONSPRO	1.4545	.5222	11
CAT	FUEL	1.1515	.3641	33
CAT	GUAGES	1.4545	.5096	22
CAT	HUMOPS	1.1875	.3966	32
CAT	HVYWAT	1.0400	.1979	50
CAT	IRAD	1.0000	0.0	3
CAT	LOGGING	1.0000	0.0	2
CAT	MINEK	1.2969	.4605	64
CAT	MINER	1.3235	.4749	34
CAT	MINEXR	1.4545	.5222	11
CAT	RADGFY	1.0000	0.0	8
CAT	REACTOR	1.0714	.2589	98
CAT	REACTORB	1.0385	.1942	52
CAT	REACTORP	1.0227	.1508	44
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	1.2500	.4523	12

Summaries of V3
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		1.1725	.3782	487
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	1.0690	.2579	29
CAT	CONSOL	1.3448	.4837	29
CAT	CONSPRO	1.2222	.4410	9
CAT	FUEL	1.2069	.4123	29
CAT	GUAGES	1.2632	.4524	19
CAT	HUMOPS	1.2800	.4583	25
CAT	HVYWAT	1.0217	.1474	46
CAT	IRAD	1.3333	.5774	3
CAT	LOGGING	1.0000	0.0	2
CAT	MINEK	1.4737	.5037	57
CAT	MINER	1.6000	.5000	25
CAT	MINEXR	1.3333	.5000	9
CAT	RADGFY	1.1429	.3780	7
CAT	REACTOR	1.0222	.1482	90
CAT	REACTORB	1.0000	0.0	51
CAT	REACTORP	1.0238	.1543	42
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	1.0833	.2887	12

Summaries of V4
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		1.4640	.4992	541
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	1.2581	.4448	31
CAT	CONSOL	1.7273	.4523	33
CAT	CONSPRO	1.6364	.5045	11
CAT	FUEL	1.4848	.5075	33
CAT	GUAGES	1.5909	.5032	22
CAT	HUMOPS	1.7813	.4200	32
CAT	HVYWAT	1.4000	.4949	50
CAT	IRAD	1.3333	.5774	3
CAT	LOGGING	1.5000	.7071	2
CAT	MINEK	1.8281	.3803	64
CAT	MINER	1.9706	.1715	34
CAT	MINEXR	1.9091	.3015	11
CAT	RADGFY	1.1429	.3780	7
CAT	REACTOR	1.2062	.4067	97
CAT	REACTORB	1.1538	.3643	52
CAT	REACTORP	1.1591	.3700	44
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	1.3333	.4924	12

Summaries of V9
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		1.9963	1.0028	540
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	2.0968	1.1062	31
CAT	CONSOL	1.8438	.9197	32
CAT	CONSPRO	1.8182	.7508	11
CAT	FUEL	1.6970	.8472	33
CAT	GUAGES	2.4091	1.2968	22
CAT	HUMOPS	1.7188	.7719	32
CAT	HVYWAT	1.7800	.7637	50
CAT	IRAD	2.3333	.5774	3
CAT	LOGGING	1.0000	0.0	2
CAT	MINEK	2.4921	1.1760	63
CAT	MINER	2.0303	.9180	33
CAT	MINEXR	2.2727	.9045	11
CAT	RADGFY	1.6250	.9161	8
CAT	REACTOR	1.5918	.7156	98
CAT	REACTORB	2.2500	1.0266	52
CAT	REACTORP	2.5909	1.1677	44
CAT	TARGET	2.0000	0.0	1
CAT	TELPY	1.5833	.7930	12

Summaries of V10
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.0776	.7967	541
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	2.4516	.9605	31
CAT	CONSOL	2.1818	.9828	33
CAT	CONSPRO	2.7273	.6467	11
CAT	FUEL	2.0938	.9625	32
CAT	GUAGES	2.4091	.8541	22
CAT	HUMOPS	2.0000	.7184	32
CAT	HVYWAT	1.7800	.6158	50
CAT	IRAD	2.0000	1.0000	3
CAT	LOGGING	2.0000	1.4142	2
CAT	MINEK	2.3281	.7571	64
CAT	MINER	2.0294	.7582	34
CAT	MINEXR	2.0909	.7006	11
CAT	RADGFY	1.8750	.8345	8
CAT	REACTOR	1.8673	.6679	98
CAT	REACTORB	2.1538	.6969	52
CAT	REACTORP	2.0000	.8069	44
CAT	TARGET	3.0000	0.0	1
CAT	TELPY	1.7273	.7862	11

Summaries of V11
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		3.7620	4.2571	542
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	5.6774	4.8055	31
CAT	CONSOL	5.2813	5.1821	32
CAT	CONSPRO	8.6364	5.1239	11
CAT	FUEL	2.6970	3.8688	33
CAT	GUAGES	4.0909	4.1965	22
CAT	HUMOPS	3.2813	3.2847	32
CAT	HVYWAT	3.6200	3.9790	50
CAT	IRAD	6.0000	3.4641	3
CAT	LOGGING	4.0000	0.0	2
CAT	MINEK	3.4688	4.0707	64
CAT	MINER	2.2059	2.7389	34
CAT	MINEXR	1.0000	0.0	11
CAT	RADGFY	5.1250	4.5493	8
CAT	REACTOR	2.2245	3.5334	98
CAT	REACTORB	5.9038	4.6495	52
CAT	REACTORP	4.2955	4.5422	44
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	3.5000	4.1670	12

Summaries of V12
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		3.6858	3.7180	541
CAT	ACCEL	2.5000	.7071	2
CAT	ANAL	5.4839	4.3349	31
CAT	CONSOL	5.1875	4.8821	32
CAT	CONSPRO	4.8182	5.0362	11
CAT	FUEL	2.6667	3.4065	33
CAT	GUAGES	4.8182	3.5002	22
CAT	HUMOPS	3.9375	3.6184	32
CAT	HVYWAT	3.8200	3.9625	50
CAT	IRAD	9.0000	1.7321	3
CAT	LOGGING	10.0000	0.0	2
CAT	MINEK	3.5000	3.6645	64
CAT	MINER	2.7941	3.4796	34
CAT	MINEXR	1.2727	.6467	11
CAT	RADGFY	5.6250	3.5026	8
CAT	REACTOR	2.5258	2.9968	97
CAT	REACTORB	3.8654	3.7049	52
CAT	REACTORP	3.3409	2.3422	44
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	5.8333	4.4890	12

Summaries of V13
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		.7073	3.8458	533
CAT	ACCEL			
CAT	ANAL	6.0000	5.6569	2
CAT	CONSOL	.0968	.3962	31
CAT	CONSPRO	0.0	0.0	32
CAT	FUEL	0.0	0.0	10
CAT	GUAGES	1.8750	8.9578	32
CAT	HUMOPS	.9545	4.2592	22
CAT	HVYWAT	.3438	1.0035	32
CAT	IRAD	.0600	.3136	50
CAT	LOGGING	.6667	1.1547	3
CAT	MINEK	0.0	0.0	2
CAT	MINER	.3871	1.5188	62
CAT	MINEXR	.3939	1.1974	33
CAT	RADGFY	.3636	.8090	11
CAT	REACTOR	6.6250	7.5958	8
CAT	REACTORB	1.0208	5.7783	96
CAT	REACTORP	.5098	1.7706	51
CAT	TARGET	.9070	3.4490	43
CAT	TELPY	6.0000	0.0	1
		.1667	.5774	12

Summaries of V14
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.4723	7.1289	487
CAT	ACCEL			
CAT	ANAL	17.5000	10.6066	2
CAT	CONSOL	.4839	1.0286	31
CAT	CONSPRO	.2903	.8244	31
CAT	FUEL	.8182	1.2505	11
CAT	GUAGES	2.8710	9.0508	31
CAT	HUMOPS	1.5000	4.3616	22
CAT	HVYWAT	.9355	1.8962	31
CAT	IRAD	3.6304	6.9358	46
CAT	LOGGING	.6667	1.1547	3
CAT	MINEK	2.5000	.7071	2
CAT	MINER	2.0000	4.5925	56
CAT	MINEXR	1.3462	2.6373	26
CAT	RADGFY	1.1250	2.1002	8
CAT	REACTOR	7.8000	9.0388	5
CAT	REACTORB	1.6829	4.7632	82
CAT	REACTORP	3.5217	10.3015	46
CAT	TARGET	5.3415	11.6246	41
CAT	TELPY	12.0000	0.0	1
		7.0833	18.5053	12

Summaries of V15
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.6083	5.0378	457
CAT	ACCEL	2.0000	0.0	2
CAT	ANAL	.8462	1.5670	26
CAT	CONSOL	.3333	1.0283	30
CAT	CONSPRO	.6000	1.8974	10
CAT	FUEL	6.7692	10.2306	26
CAT	GUAGES	1.4545	4.4048	22
CAT	HUMOPS	1.2414	3.3770	29
CAT	HVYWAT	3.8333	4.6629	36
CAT	IRAD	1.3333	2.3094	3
CAT	LOGGING	8.0000	2.8284	2
CAT	MINEK	2.9216	4.6297	51
CAT	MINER	1.9286	3.4740	28
CAT	MINEXR	3.0000	3.0551	7
CAT	RADGFY	8.4000	7.9246	5
CAT	REACTOR	2.3810	3.3434	84
CAT	REACTORB	4.1190	8.4282	42
CAT	REACTORP	2.3171	3.4960	41
CAT	TARGET	3.0000	0.0	1
CAT	TELPY	.9167	1.8809	12

Summaries of V16
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.1505	1.0621	525
CAT	ACCEL	2.5000	.7071	2
CAT	ANAL	1.9000	.8847	30
CAT	CONSOL	2.3750	1.0395	32
CAT	CONSPRO	2.6667	1.1180	9
CAT	FUEL	2.2727	1.0687	33
CAT	GUAGES	2.0000	.9258	22
CAT	HUMOPS	2.2667	.7397	30
CAT	HVYWAT	2.3750	1.2312	48
CAT	IRAD	2.0000	1.0000	3
CAT	LOGGING	2.0000	0.0	2
CAT	MINEK	1.9677	1.0076	62
CAT	MINER	2.0323	.9123	31
CAT	MINEXR	1.6667	1.1180	9
CAT	RADGFY	1.8750	.8345	8
CAT	REACTOR	2.5368	1.2784	95
CAT	REACTORB	2.0192	.8743	52
CAT	REACTORP	1.5455	.8478	44
CAT	TARGET	3.0000	0.0	1
CAT	TELPY	2.0000	.8528	12

Summaries of V17
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.1308	.9509	535
CAT	ACCEL	2.5000	.7071	2
CAT	ANAL	1.9355	.8920	31
CAT	CONSOL	2.3125	.9980	32
CAT	CONSPRO	2.1818	.8739	11
CAT	FUEL	2.1212	.8929	33
CAT	GUAGES	1.9545	.7854	22
CAT	HUMOPS	2.1333	.6288	30
CAT	HVYWAT	2.2979	1.0818	47
CAT	IRAD	2.0000	1.0000	3
CAT	LOGGING	2.0000	0.0	2
CAT	MINEK	2.0625	.8886	64
CAT	MINER	2.1875	1.0298	32
CAT	MINEXR	1.8182	1.0787	11
CAT	RADGFY	2.2500	.8864	8
CAT	REACTOR	2.3469	1.0659	98
CAT	REACTORB	2.1154	.9000	52
CAT	REACTORP	1.6136	.7840	44
CAT	TARGET	2.0000	0.0	1
CAT	TELPY	2.4167	1.0836	12

Summaries of V18
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		1.4129	.4929	448
CAT	ACCEL	2.0000	0.0	2
CAT	ANAL	1.5357	.5079	28
CAT	CONSOL	1.8077	.4019	26
CAT	CONSPRO	1.4000	.5477	5
CAT	FUEL	1.4286	.5040	28
CAT	GUAGES	1.3500	.4894	20
CAT	HUMOPS	1.5714	.5071	21
CAT	HVYWAT	1.4667	.5045	45
CAT	IRAD	1.6667	.5774	3
CAT	LOGGING	1.5000	.7071	2
CAT	MINEK	1.2807	.4533	57
CAT	MINER	1.2857	.4600	28
CAT	MINEXR	1.4286	.5345	7
CAT	RADGFY	1.3750	.5175	8
CAT	REACTOR	1.4795	.5030	73
CAT	REACTORB	1.2273	.4239	44
CAT	REACTORP	1.2381	.4311	42
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	1.6250	.5175	8

Summaries of V19
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		3.7829	1.1555	456
CAT	ACCEL	3.0000	1.4142	2
CAT	ANAL	3.9565	1.2239	23
CAT	CONSOL	3.8947	1.1002	19
CAT	CONSPRO	4.1250	.9910	8
CAT	FUEL	3.8387	1.1575	31
CAT	GUAGES	4.0500	1.0990	20
CAT	HUMOPS	3.3333	1.3077	24
CAT	HVYWAT	3.6905	1.0238	42
CAT	IRAD	4.3333	.5774	3
CAT	LOGGING	2.5000	.7071	2
CAT	MINEK	3.4423	1.3197	52
CAT	MINER	3.3333	1.2954	30
CAT	MINEXR	3.6364	1.1201	11
CAT	RADGFY	3.6250	.9161	8
CAT	REACTOR	3.7625	1.2553	80
CAT	REACTORB	4.2200	.8401	50
CAT	REACTORP	4.1463	.9100	41
CAT	TARGET	2.0000	0.0	1
CAT	TELPY	4.0000	.7071	9

Summaries of V20
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		3.3266	1.1255	496
CAT	ACCEL	4.0000	0.0	2
CAT	ANAL	3.4286	1.2301	28
CAT	CONSOL	3.5417	1.1788	24
CAT	CONSPRO	3.4000	.9661	10
CAT	FUEL	3.2500	.9837	32
CAT	GUAGES	3.4762	1.1233	21
CAT	HUMOPS	2.9200	1.0376	25
CAT	HVYWAT	3.0625	1.1375	48
CAT	IRAD	4.0000	0.0	3
CAT	LOGGING	2.5000	2.1213	2
CAT	MINEK	3.4000	1.1960	60
CAT	MINER	3.1471	1.3736	34
CAT	MINEXR	3.0909	1.1362	11
CAT	RADGFY	3.1250	.6409	8
CAT	REACTOR	3.3793	1.1022	87
CAT	REACTORB	3.4600	1.0539	50
CAT	REACTORP	3.3415	1.1093	41
CAT	TARGET	4.0000	0.0	1
CAT	TELPY	3.8889	1.0541	9

Summaries of V21A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.4932	2.8003	515
CAT	ACCEL	3.0000	1.4142	2
CAT	ANAL	5.9677	3.0275	31
CAT	CONSOL	4.9667	3.1237	30
CAT	CONSPRO	3.9000	2.5144	10
CAT	FUEL	4.2759	2.4480	29
CAT	GUAGES	5.0556	2.4125	18
CAT	HUMOPS	6.0000	2.4928	29
CAT	HVYWAT	5.5714	2.9861	49
CAT	IRAD	4.3333	2.3094	3
CAT	LOGGING	2.0000	1.4142	2
CAT	MINEK	6.0645	3.0988	62
CAT	MINER	4.8182	2.6979	33
CAT	MINEXR	5.2727	2.6867	11
CAT	RADGFY	4.3750	3.2923	8
CAT	REACTOR	5.6804	2.6986	97
CAT	REACTORB	3.4600	1.0539	50
CAT	REACTORP	3.3415	1.1093	41
CAT	TARGET	4.0000	0.0	1
CAT	TELPY	3.8889	1.0541	9

Summaries of V21B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.3553	2.8972	501
CAT	ACCEL	3.0000	1.4142	2
CAT	ANAL	5.2759	3.1836	29
CAT	CONSOL	5.0000	3.3110	28
CAT	CONSPRO	3.9000	2.3781	10
CAT	FUEL	5.1724	2.8039	29
CAT	GUAGES	5.1053	2.5143	19
CAT	HUMOPS	6.7500	2.6194	28
CAT	HVYWAT	5.5957	2.8640	47
CAT	IRAD	6.0000	3.4641	3
CAT	LOGGING	4.5000	4.9497	2
CAT	MINEK	5.1774	3.1702	62
CAT	MINER	4.0938	3.0729	32
CAT	MINEXR	5.4545	2.6968	11
CAT	RADGFY	4.0000	2.7689	7
CAT	REACTOR	5.3441	2.7760	93
CAT	REACTORB	5.7660	2.4066	47
CAT	REACTORP	6.2381	2.9118	42
CAT	TARGET	4.0000	0.0	1
CAT	TELPY	5.0000	2.8284	9

Summaries of V22A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		4.7769	2.6556	520
CAT	ACCEL	1.5000	.7071	2
CAT	ANAL	5.7931	2.1444	29
CAT	CONSOL	3.5667	2.8000	30
CAT	CONSPRO	4.7273	2.4121	11
CAT	FUEL	4.8387	2.6845	31
CAT	GUAGES	5.5000	2.1761	18
CAT	HUMOPS	4.7333	2.5316	30
CAT	HVYWAT	5.3265	2.4781	49
CAT	IRAD	2.6667	2.0817	3
CAT	LOGGING	3.5000	3.5355	2
CAT	MINEK	4.5323	2.6962	62
CAT	MINER	5.0000	3.0451	34
CAT	MINEXR	4.5455	2.3817	11
CAT	RADGFY	2.6250	1.7678	8
CAT	REACTOR	4.9691	2.6710	97
CAT	REACTORB	4.6275	2.7565	51
CAT	REACTORP	4.8810	2.8302	42
CAT	TARGET	6.0000	0.0	1
CAT	TELPY	4.0000	2.0616	9

Summaries of V22B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.4595	2.2631	457
CAT	ACCEL	1.5000	.7071	2
CAT	ANAL	3.3750	2.4815	24
CAT	CONSOL	1.6000	1.1902	25
CAT	CONSPRO	2.7000	2.0028	10
CAT	FUEL	2.4815	2.5776	27
CAT	GUAGES	2.0588	1.4778	17
CAT	HUMOPS	2.1923	1.9395	26
CAT	HVYWAT	3.0000	2.7497	42
CAT	IRAD	3.3333	1.5275	3
CAT	LOGGING	1.0000	0.0	1
CAT	MINEK	3.1333	2.9022	60
CAT	MINER	2.7273	2.5529	33
CAT	MINEXR	3.3636	1.4334	11
CAT	RADGFY	2.5714	1.8127	7
CAT	REACTOR	2.2000	1.9313	75
CAT	REACTORB	1.7333	1.9235	45
CAT	REACTORP	2.1707	2.0845	41
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	1.5714	1.1339	7

Summaries of V23A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		6.9731	2.4501	521
CAT	ACCEL	5.5000	3.5355	2
CAT	ANAL	6.6774	2.6757	31
CAT	CONSOL	6.7000	2.8666	30
CAT	CONSPRO	5.9091	2.8794	11
CAT	FUEL	7.2667	2.2884	30
CAT	GUAGES	6.6111	2.4287	18
CAT	HUMOPS	7.8333	1.5775	30
CAT	HVYWAT	6.3617	2.8849	47
CAT	IRAD	9.0000	1.7321	3
CAT	LOGGING	8.0000	0.0	2
CAT	MINEK	7.0159	2.6609	63
CAT	MINER	5.9091	2.8324	33
CAT	MINEXR	7.0909	1.8684	11
CAT	RADGFY	6.7500	1.7525	8
CAT	REACTOR	7.3711	2.2973	97
CAT	REACTORB	6.9800	2.1617	50
CAT	REACTORP	7.1163	2.1181	43
CAT	TARGET	7.0000	0.0	1
CAT	TELPY	8.0909	1.8684	11

Summaries of V23B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		6.4789	2.7157	497
CAT	ACCEL	5.5000	3.5355	2
CAT	ANAL	6.2143	2.9484	28
CAT	CONSOL	6.1481	2.7832	27
CAT	CONSPRO	5.9000	3.0350	10
CAT	FUEL	6.6207	2.5130	29
CAT	GUAGES	6.5294	2.5029	17
CAT	HUMOPS	7.0357	2.4416	28
CAT	HVYWAT	5.9535	2.9757	43
CAT	IRAD	8.6667	2.3094	3
CAT	LOGGING	8.0000	0.0	2
CAT	MINEK	6.1774	3.1959	62
CAT	MINER	5.3333	2.7576	33
CAT	MINEXR	6.2727	2.5334	11
CAT	RADGFY	6.7143	2.0587	7
CAT	REACTOR	7.2421	2.4999	95
CAT	REACTORB	6.4792	2.4494	48
CAT	REACTORP	6.5238	2.4519	42
CAT	TARGET	7.0000	0.0	1
CAT	TELPY	6.3333	3.1225	9

Summaries of V24A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.8665	2.5744	517
CAT	ACCEL	4.5000	4.9497	2
CAT	ANAL	5.5000	2.9566	30
CAT	CONSOL	5.6333	2.8465	30
CAT	CONSPRO	4.6000	2.5033	10
CAT	FUEL	5.7333	2.5452	30
CAT	GUAGES	5.3684	2.8715	19
CAT	HUMOPS	6.9000	2.0060	30
CAT	HVYWAT	5.8333	2.5124	48
CAT	IRAD	8.3333	2.8868	3
CAT	LOGGING	7.5000	.7071	2
CAT	MINEK	6.0645	2.7092	62
CAT	MINER	5.0000	2.8174	33
CAT	MINEXR	5.8182	2.4008	11
CAT	RADGFY	6.0000	3.7033	8
CAT	REACTOR	6.1546	2.4081	97
CAT	REACTORB	5.6327	2.1956	49
CAT	REACTORP	6.1163	2.5280	43
CAT	TARGET	8.0000	0.0	1
CAT	TELPY	5.1111	2.0883	9

Summaries of V24B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		4.9004	2.7710	492
CAT	ACCEL	3.0000	2.8284	2
CAT	ANAL	4.7857	2.9609	28
CAT	CONSOL	4.9231	3.0584	26
CAT	CONSPRO	4.1000	1.9692	10
CAT	FUEL	4.4138	2.2602	29
CAT	GUAGES	4.7778	2.6691	18
CAT	HUMOPS	5.5185	2.6511	27
CAT	HVYWAT	4.9091	2.5864	44
CAT	IRAD	8.0000	3.4641	3
CAT	LOGGING	2.5000	.7071	2
CAT	MINEK	5.2097	3.0035	62
CAT	MINER	4.0303	2.6982	33
CAT	MINEXR	6.1818	2.0889	11
CAT	RADGFY	6.0000	3.3166	7
CAT	REACTOR	5.3333	2.7399	93
CAT	REACTORB	4.0000	2.3219	47
CAT	REACTORP	5.1707	3.0895	41
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	3.8750	3.2266	8

Summaries of V25A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		6.7083	2.5501	521
CAT	ACCEL	8.0000	0.0	2
CAT	ANAL	7.0645	2.0645	31
CAT	CONSOL	6.5000	3.0371	30
CAT	CONSPRO	5.0909	3.5624	11
CAT	FUEL	6.7000	2.0869	30
CAT	GUAGES	8.5263	1.4286	19
CAT	HUMOPS	7.6129	2.3899	31
CAT	HVYWAT	6.0652	2.1950	46
CAT	IRAD	6.6667	3.0551	3
CAT	LOGGING	8.5000	.7071	2
CAT	MINEK	6.7097	2.7544	62
CAT	MINER	6.0000	2.9475	33
CAT	MINEXR	6.7273	2.6867	11
CAT	RADGFY	7.0000	1.1952	8
CAT	REACTOR	6.6598	2.6295	97
CAT	REACTORB	6.1569	2.4362	51
CAT	REACTORP	7.1860	2.4029	43
CAT	TARGET	8.0000	0.0	1
CAT	TELPY	7.3000	2.6687	10

Summaries of V25B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		3.3260	2.9314	457
CAT	ACCEL	3.0000	2.8284	2
CAT	ANAL	4.4091	3.4318	22
CAT	CONSOL	2.8000	2.3094	25
CAT	CONSPRO	1.8000	1.4757	10
CAT	FUEL	3.2222	2.8734	27
CAT	GUAGES	3.5294	3.4117	17
CAT	HUMOPS	2.6538	2.0965	26
CAT	HVYWAT	3.4103	2.3921	39
CAT	IRAD	8.0000	2.8284	2
CAT	LOGGING	2.0000	0.0	1
CAT	MINEK	4.1148	3.6656	61
CAT	MINER	3.1250	2.6488	32
CAT	MINEXR	5.6364	3.3845	11
CAT	RADGFY	4.7143	2.8702	7
CAT	REACTOR	3.2625	2.7867	80
CAT	REACTORB	2.2222	2.4298	45
CAT	REACTORP	3.0750	2.9990	40
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	3.4444	3.1269	9

Summaries of V26A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		4.0951	3.0019	494
CAT	ACCEL	3.0000	1.4142	2
CAT	ANAL	4.8966	2.9562	29
CAT	CONSOL	3.2692	3.0927	26
CAT	CONSPRO	2.2000	1.3166	10
CAT	FUEL	3.8333	2.4786	30
CAT	GUAGES	4.4118	2.8952	17
CAT	HUMOPS	3.1379	2.4600	29
CAT	HVYWAT	4.3830	2.8556	47
CAT	IRAD	2.6667	2.8868	3
CAT	LOGGING	3.0000	2.8284	2
CAT	MINEK	4.7581	3.6018	62
CAT	MINER	5.2353	3.5765	34
CAT	MINEXR	4.0000	1.9494	11
CAT	RADGFY	4.8750	2.6959	8
CAT	REACTOR	3.9091	2.8873	88
CAT	REACTORB	3.0000	2.1396	46
CAT	REACTORP	4.9512	3.5704	41
CAT	TARGET	2.0000	0.0	1
CAT	TELPY	3.0000	1.6903	8

Summaries of V26B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		6.0299	2.9143	501
CAT	ACCEL	6.0000	1.4142	2
CAT	ANAL	5.9310	2.8652	29
CAT	CONSOL	4.7857	3.2014	28
CAT	CONSPRO	4.8182	3.6829	11
CAT	FUEL	6.2759	2.8772	29
CAT	GUAGES	6.8421	2.3157	19
CAT	HUMOPS	7.0000	2.8284	29
CAT	HVYWAT	5.5652	2.7297	46
CAT	IRAD	7.6667	2.0817	3
CAT	LOGGING	7.5000	3.5355	2
CAT	MINEK	6.5000	3.0555	62
CAT	MINER	5.4375	3.1616	32
CAT	MINEXR	3.7273	2.1950	11
CAT	RADGFY	5.8571	2.1157	7
CAT	REACTOR	6.2473	2.8194	93
CAT	REACTORB	5.4167	2.7969	48
CAT	REACTORP	6.7857	2.8588	42
CAT	TARGET	9.0000	0.0	1
CAT	TELPY	6.7143	2.5635	7

Summaries of V28A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.5909	2.7244	506
CAT	ACCEL	5.5000	.7071	2
CAT	ANAL	6.3448	2.3033	29
CAT	CONSOL	6.0000	2.8803	28
CAT	CONSPRO	5.0909	2.7002	11
CAT	FUEL	5.3000	2.4090	30
CAT	GUAGES	6.2000	1.7652	20
CAT	HUMOPS	6.3667	2.2664	30
CAT	HVYWAT	4.6739	2.7813	46
CAT	IRAD	7.0000	2.6458	3
CAT	LOGGING	6.5000	.7071	2
CAT	MINEK	5.3871	3.2104	62
CAT	MINER	6.2121	2.7924	33
CAT	MINEXR	5.3636	2.1106	11
CAT	RADGFY	6.3750	2.1339	8
CAT	REACTOR	5.5056	2.8209	89
CAT	REACTORB	5.1373	2.3666	51
CAT	REACTORP	5.6905	3.3018	42
CAT	TARGET	8.0000	0.0	1
CAT	TELPY	4.8750	2.4165	8

Summaries of V28B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		4.6782	2.9316	491
CAT	ACCEL	1.5000	.7071	2
CAT	ANAL	5.3846	2.8576	26
CAT	CONSOL	5.1429	3.2627	28
CAT	CONSPRO	4.9000	3.0350	10
CAT	FUEL	4.3793	2.5413	29
CAT	GUAGES	4.7500	2.4682	20
CAT	HUMOPS	5.0000	2.8420	27
CAT	HVYWAT	4.0667	2.6578	45
CAT	IRAD	5.6667	.5774	3
CAT	LOGGING	6.0000	1.4142	2
CAT	MINEK	4.2581	3.1826	62
CAT	MINER	4.9394	2.9679	33
CAT	MINEXR	5.0909	2.9139	11
CAT	RADGFY	5.4286	3.2071	7
CAT	REACTOR	5.1461	2.9678	89
CAT	REACTORB	3.3125	2.1354	48
CAT	REACTORP	5.2927	3.4874	41
CAT	TARGET	8.0000	0.0	1
CAT	TELPY	4.1429	3.3877	7

Summaries of V27A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		6.8378	2.5105	518
CAT	ACCEL	5.0000	2.8284	2
CAT	ANAL	6.7241	2.8271	29
CAT	CONSOL	5.4483	2.9951	29
CAT	CONSPRO	7.1818	2.0405	11
CAT	FUEL	7.3667	2.0424	30
CAT	GUAGES	7.0000	2.5752	20
CAT	HUMOPS	7.0645	2.0483	31
CAT	HVYWAT	6.6809	2.2078	47
CAT	IRAD	5.3333	4.5092	3
CAT	LOGGING	5.0000	4.2426	2
CAT	MINEK	6.6290	2.7475	62
CAT	MINER	6.5882	2.9860	34
CAT	MINEXR	7.4545	1.3685	11
CAT	RADGFY	7.8750	1.9594	8
CAT	REACTOR	6.8557	2.4579	97
CAT	REACTORB	6.7800	2.5257	50
CAT	REACTORP	7.6977	2.3046	43
CAT	TARGET	8.0000	0.0	1
CAT	TELPY	7.1250	1.7269	8

Summaries of V27B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		6.6068	2.6486	501
CAT	ACCEL	5.0000	0.0	2
CAT	ANAL	5.4483	3.3444	29
CAT	CONSOL	5.9286	3.0904	28
CAT	CONSPRO	6.9091	2.2563	11
CAT	FUEL	6.9310	2.3442	29
CAT	GUAGES	7.0500	2.8373	20
CAT	HUMOPS	6.7931	2.2894	29
CAT	HVYWAT	6.7111	2.2322	45
CAT	IRAD	8.0000	2.0000	3
CAT	LOGGING	5.0000	0.0	1
CAT	MINEK	6.5082	2.9190	61
CAT	MINER	5.9091	3.0554	33
CAT	MINEXR	6.5000	1.9003	10
CAT	RADGFY	8.1429	1.6762	7
CAT	REACTOR	6.6915	2.5904	94
CAT	REACTORB	6.7708	2.3900	48
CAT	REACTORP	7.2791	2.5665	43
CAT	TARGET	8.0000	0.0	1
CAT	TELPY	5.8571	2.6095	7

Summaries of V29A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		4.8596	2.6773	513
CAT	ACCEL	8.0000	2.8284	2
CAT	ANAL	6.1333	2.9680	30
CAT	CONSOL	5.7931	3.1211	29
CAT	CONSPRO	5.1818	3.2193	11
CAT	FUEL	4.8667	2.3004	30
CAT	GUAGES	5.3333	2.5896	18
CAT	HUMOPS	5.2333	2.2234	30
CAT	HVYWAT	4.5652	2.4097	46
CAT	IRAD	6.0000	1.7321	3
CAT	LOGGING	1.5000	.7071	2
CAT	MINEK	4.7097	3.0749	62
CAT	MINER	4.8235	2.5521	34
CAT	MINEXR	4.2727	2.4532	11
CAT	RADGFY	2.2500	1.3887	8
CAT	REACTOR	4.8526	2.7866	95
CAT	REACTORB	4.4000	2.0404	50
CAT	REACTORP	4.4048	2.6965	42
CAT	TARGET	3.0000	0.0	1
CAT	TELPY	5.3333	2.1213	9

Summaries of V29B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		4.0062	2.6860	486
CAT	ACCEL	8.0000	2.8284	2
CAT	ANAL	5.0000	2.8148	27
CAT	CONSOL	4.0741	2.9079	27
CAT	CONSPRO	2.8000	1.8738	10
CAT	FUEL	4.1379	2.7088	29
CAT	GUAGES	4.2222	2.3901	18
CAT	HUMOPS	4.7857	2.4092	28
CAT	HVYWAT	3.9091	2.3705	44
CAT	IRAD	5.6667	4.5092	3
CAT	LOGGING	1.5000	.7071	2
CAT	MINEK	4.2581	3.1044	62
CAT	MINER	4.3125	3.0101	32
CAT	MINEXR	4.5000	2.6771	10
CAT	RADGFY	1.8571	.8997	7
CAT	REACTOR	4.0116	2.6898	86
CAT	REACTORB	3.0625	2.0043	48
CAT	REACTORP	3.5714	2.6146	42
CAT	TARGET	3.0000	0.0	1
CAT	TELPY	3.8750	2.9970	8

Summaries of V30A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.8478	2.6938	519
CAT	ACCEL	7.5000	.7071	2
CAT	ANAL	7.2903	2.1478	31
CAT	CONSOL	6.0345	3.0762	29
CAT	CONSPRO	6.5455	2.4643	11
CAT	FUEL	6.3667	2.0083	30
CAT	GUAGES	5.1667	2.7062	18
CAT	HUMOPS	7.1667	2.4925	30
CAT	HVYWAT	5.4583	2.4922	48
CAT	IRAD	8.6667	1.1547	3
CAT	LOGGING	5.0000	0.0	2
CAT	MINEK	5.4194	2.9838	62
CAT	MINER	5.6176	2.8817	34
CAT	MINEXR	5.3636	3.2023	11
CAT	RADGFY	4.7500	3.4538	8
CAT	REACTOR	5.1579	2.6710	95
CAT	REACTORB	6.2115	2.3038	52
CAT	REACTORP	5.6190	2.8452	42
CAT	TARGET	3.0000	0.0	1
CAT	TELPY	7.4000	1.1738	10

Summaries of V30B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.4341	2.7919	493
CAT	ACCEL	7.5000	.7071	2
CAT	ANAL	6.3929	2.9607	28
CAT	CONSOL	4.6923	2.7095	26
CAT	CONSPRO	5.8000	2.8206	10
CAT	FUEL	5.8276	2.5223	29
CAT	GUAGES	4.2941	3.0365	17
CAT	HUMOPS	5.8148	2.6463	27
CAT	HVYWAT	5.1111	2.6044	45
CAT	IRAD	6.6667	3.5119	3
CAT	LOGGING	5.5000	3.5355	2
CAT	MINEK	5.0968	2.8842	62
CAT	MINER	4.6364	2.7818	33
CAT	MINEXR	5.6364	3.0748	11
CAT	RADGFY	5.0000	3.3665	7
CAT	REACTOR	5.3000	2.7126	90
CAT	REACTORB	6.2245	2.4261	49
CAT	REACTORP	5.9524	3.0917	42
CAT	TARGET	3.0000	0.0	1
CAT	TELPY	4.8889	3.1798	9

Summaries of V31A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.4845	2.7009	516
CAT	ACCEL	8.0000	2.8284	2
CAT	ANAL	5.3667	2.9418	30
CAT	CONSOL	6.7333	2.6514	30
CAT	CONSPRO	5.4000	2.7968	10
CAT	FUEL	5.5333	2.4598	30
CAT	GUAGES	6.1500	2.4554	20
CAT	HUMOPS	6.2258	2.6040	31
CAT	HVYWAT	5.5652	2.2672	46
CAT	IRAD	7.0000	1.7321	3
CAT	LOGGING	6.0000	1.4142	2
CAT	MINEK	5.7903	2.6059	62
CAT	MINER	5.2941	2.7692	34
CAT	MINEXR	6.4000	2.5033	10
CAT	RADGFY	2.4286	2.2991	7
CAT	REACTOR	5.1771	2.5915	96
CAT	REACTORB	4.9000	2.5655	50
CAT	REACTORP	4.8605	3.2336	43
CAT	TARGET	7.0000	0.0	1
CAT	TELPY	5.3333	2.5000	9

Summaries of V31B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.5473	2.4136	455
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	3.5652	3.1598	23
CAT	CONSOL	2.4000	2.5820	25
CAT	CONSPRO	1.8000	1.3166	10
CAT	FUEL	2.1429	1.8199	28
CAT	GUAGES	2.4444	2.1481	18
CAT	HUMOPS	2.4615	2.4533	26
CAT	HVYWAT	2.8537	2.3083	41
CAT	IRAD	3.6667	2.3094	3
CAT	LOGGING	2.0000	0.0	1
CAT	MINEK	3.0968	2.8498	62
CAT	MINER	2.5455	2.5750	33
CAT	MINEXR	4.0000	2.9814	10
CAT	RADGFY	2.5000	2.5100	6
CAT	REACTOR	2.6216	2.3912	74
CAT	REACTORB	1.7674	1.9741	43
CAT	REACTORP	1.9268	1.9798	41
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	2.2500	1.5811	8

Summaries of V32A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.7743	2.8687	514
CAT	ACCEL	5.0000	4.2426	2
CAT	ANAL	6.2903	2.4248	31
CAT	CONSOL	6.3000	3.1530	30
CAT	CONSPRO	5.2727	3.2277	11
CAT	FUEL	6.1333	2.4738	30
CAT	GUAGES	6.7222	2.6746	18
CAT	HUMOPS	5.8710	2.9410	31
CAT	HVYWAT	5.8478	2.5903	46
CAT	IRAD	6.6667	3.5119	3
CAT	LOGGING	8.0000	1.4142	2
CAT	MINEK	5.9032	2.9847	62
CAT	MINER	4.9118	3.3698	34
CAT	MINEXR	5.6364	3.3548	11
CAT	RADGFY	3.6250	2.5036	8
CAT	REACTOR	5.2418	2.8610	91
CAT	REACTORB	6.0200	2.5192	50
CAT	REACTORP	6.0698	3.1502	43
CAT	TARGET	7.0000	0.0	1
CAT	TELPY	5.4000	2.5033	10

Summaries of V32B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.8448	2.9305	496
CAT	ACCEL	5.5000	.7071	2
CAT	ANAL	6.1481	2.9050	27
CAT	CONSOL	5.7778	3.4455	27
CAT	CONSPRO	5.0000	3.8730	11
CAT	FUEL	6.2069	2.4695	29
CAT	GUAGES	6.6500	2.9607	20
CAT	HUMOPS	6.1786	2.9821	28
CAT	HVYWAT	5.8372	3.0153	43
CAT	IRAD	5.3333	2.5166	3
CAT	LOGGING	8.0000	1.4142	2
CAT	MINEK	5.9194	2.8069	62
CAT	MINER	4.9697	3.4322	33
CAT	MINEXR	6.0909	3.2390	11
CAT	RADGFY	4.0000	2.7080	7
CAT	REACTOR	5.7191	2.8203	89
CAT	REACTORB	6.0816	2.5235	49
CAT	REACTORP	5.8372	3.2945	43
CAT	TARGET	7.0000	0.0	1
CAT	TELPY	5.6667	2.0616	9

Summaries of V33A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		4.5764	2.6865	517
CAT	ACCEL	1.5000	.7071	2
CAT	ANAL	5.8333	2.6533	30
CAT	CONSOL	3.4333	2.4023	30
CAT	CONSPRO	4.8182	1.9400	11
CAT	FUEL	4.5172	2.3848	29
CAT	GUAGES	5.6667	2.5205	18
CAT	HUMOPS	4.6000	2.6600	30
CAT	HVYWAT	5.0638	2.7059	47
CAT	IRAD	3.6667	1.5275	3
CAT	LOGGING	4.0000	4.2426	2
CAT	MINEK	4.1774	2.4928	62
CAT	MINER	5.1471	3.0164	34
CAT	MINEXR	4.4545	2.9787	11
CAT	RADGFY	2.5000	1.6903	8
CAT	REACTOR	5.0208	2.6949	96
CAT	REACTORB	3.9000	2.6438	50
CAT	REACTORP	4.1395	2.8915	43
CAT	TARGET	4.0000	0.0	1
CAT	TELPY	4.2000	2.6162	10

Summaries of V33B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		2.4685	2.2921	461
CAT	ACCEL	1.0000	0.0	2
CAT	ANAL	3.0833	2.5353	24
CAT	CONSOL	1.7600	1.3928	25
CAT	CONSPRO	2.6000	2.4129	10
CAT	FUEL	2.6786	2.3579	28
CAT	GUAGES	2.4444	2.6172	18
CAT	HUMOPS	2.0400	1.8138	25
CAT	HVYWAT	3.2857	2.5878	42
CAT	IRAD	3.6667	2.3094	3
CAT	LOGGING	1.0000	0.0	1
CAT	MINEK	2.8226	2.6644	62
CAT	MINER	2.3333	2.3936	33
CAT	MINEXR	2.7273	2.4121	11
CAT	RADGFY	2.0000	1.5275	7
CAT	REACTOR	2.4933	2.0624	75
CAT	REACTORB	1.8444	2.0445	45
CAT	REACTORP	2.2439	2.4370	41
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	1.6250	1.1877	8

Summaries of V34A
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		7.3052	2.3674	521
CAT	ACCEL	6.5000	2.1213	2
CAT	ANAL	7.9000	2.1066	30
CAT	CONSOL	6.4333	2.8730	30
CAT	CONSPRO	6.3636	3.6131	11
CAT	FUEL	7.8387	1.5726	31
CAT	GUAGES	6.9000	2.4473	20
CAT	HUMOPS	8.0667	2.0667	30
CAT	HVYWAT	6.8478	2.5295	46
CAT	IRAD	9.3333	1.1547	3
CAT	LOGGING	4.0000	1.4142	2
CAT	MINEK	7.1613	2.3553	62
CAT	MINER	7.5294	2.5134	34
CAT	MINEXR	6.7273	2.7961	11
CAT	RADGFY	7.5000	2.2039	8
CAT	REACTOR	7.5104	2.1909	96
CAT	REACTORB	6.9804	2.4289	51
CAT	REACTORP	7.5116	2.4041	43
CAT	TARGET	8.0000	0.0	1
CAT	TELPY	7.7000	1.3375	10

Summaries of V34B
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		5.2204	3.1789	481
CAT	ACCEL	5.0000	4.2426	2
CAT	ANAL	4.7083	3.4069	24
CAT	CONSOL	3.2692	2.7649	26
CAT	CONSPRO	4.5000	3.9511	10
CAT	FUEL	5.6552	3.1991	29
CAT	GUAGES	4.9000	3.3545	20
CAT	HUMOPS	5.6071	3.2127	28
CAT	HVYWAT	5.1905	2.6891	42
CAT	IRAD	7.3333	4.6188	3
CAT	LOGGING	3.0000	0.0	1
CAT	MINEK	4.9836	3.2480	61
CAT	MINER	5.3636	3.1207	33
CAT	MINEXR	5.5455	2.7700	11
CAT	RADGFY	6.1429	3.2367	7
CAT	REACTOR	6.2118	3.1362	85
CAT	REACTORP	5.2857	3.3443	42
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	4.4444	2.9202	9

Summaries of V35
By levels of CAT

Variable	Value Label	Mean	Std Dev	Cases
For Entire Population		1.9429	.2322	543
CAT	ACCEL	2.0000	0.0	2
CAT	ANAL	1.9355	.2497	31
CAT	CONSOL	1.9394	.2423	33
CAT	CONSPRO	2.0000	0.0	11
CAT	FUEL	1.9697	.1741	33
CAT	GUAGES	1.9091	.2942	22
CAT	HUMOPS	2.0000	0.0	32
CAT	HVYWAT	2.0000	0.0	50
CAT	IRAD	2.0000	0.0	3
CAT	LOGGING	1.5000	.7071	2
CAT	MINEK	1.8750	.3333	64
CAT	MINER	2.0000	0.0	34
CAT	MINEXR	2.0000	0.0	11
CAT	RADGFY	2.0000	0.0	8
CAT	REACTOR	1.9490	.2212	98
CAT	REACTORB	1.8846	.3226	52
CAT	REACTORP	1.9318	.2550	44
CAT	TARGET	1.0000	0.0	1
CAT	TELPY	2.0000	0.0	12

APPENDIX C

STATISTICAL ANALYSIS OF RELATIONSHIPS BETWEEN EMPLOYEE RESPONSES

- - - - - Kruskal-Wallis 1-way ANOVA

V13
by V7

Mean Rank	Cases		
245.15	346	V7 =	1
220.81	130	V7 =	2
	476	Total	

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
476	2.9587	.0854	9.9227	.0016

- - - - - Kruskal-Wallis 1-way ANOVA

V14
by V7

Mean Rank	Cases		
220.45	306	V7 =	1
203.27	124	V7 =	2
	430	Total	

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
430	1.6864	.1941	2.1699	.1407

- - - - - Kruskal-Wallis 1-way ANOVA

V15
by V7

Mean Rank	Cases		
214.53	290	V7 =	1
171.89	114	V7 =	2
	404	Total	

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
404	10.9131	.0010	12.5188	.0004

- - - - - Kruskal-Wallis 1-way ANOVA

V13
by V36

Mean Rank	Cases	
231.57	246	V36 = 1
252.82	237	V36 = 2
	483	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
483	2.7979	.0944	10.7883	.0010

- - - - - Kruskal-Wallis 1-way ANOVA

V14
by V36

Mean Rank	Cases	
211.12	227	V36 = 1
237.29	220	V36 = 2
	447	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
447	4.5826	.0323	6.0677	.0138

- - - - - Kruskal-Wallis 1-way ANOVA

V15
by V36

Mean Rank	Cases	
219.06	209	V36 = 1
197.84	207	V36 = 2
	416	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
416	3.2370	.0720	3.8300	.0503

- - - - - Kruskal-Wallis 1-way ANOVA

V13
by V40

Mean Rank	Cases	
216.92	113	V40 = 1
194.75	288	V40 = 2
	401	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Significance
401	2:9686	.0849	10.9799	.0009

- - - - - Kruskal-Wallis 1-way ANOVA

V14
by V40

Mean Rank	Cases	
218.06	104	V40 = 1
174.25	268	V40 = 2
	372	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Significance
372	12.4332	.0004	16.6533	.0000

- - - - - Kruskal-Wallis 1-way ANOVA

V15
by V40

Mean Rank	Cases	
182.98	100	V40 = 1
170.37	247	V40 = 2
	347	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Significance
347	1.1245	.2889	1.3303	.2488

- - - - - Kruskal-Wallis 1-way ANOVA

V13
by V45

Mean Rank	Cases	
259.80	454	V45 = 1
244.61	61	V45 = 2
	515	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
515	.5598	.4543	2.0482	.1524

- - - - - Kruskal-Wallis 1-way ANOVA

V14
by V45

Mean Rank	Cases	
239.61	412	V45 = 1
215.15	60	V45 = 2
	472	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
472	1.6841	.1944	2.2324	.1351

- - - - - Kruskal-Wallis 1-way ANOVA

V15
by V45

Mean Rank	Cases	
228.11	386	V45 = 1
175.92	56	V45 = 2
	442	Total

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
442	8.1646	.0043	9.6406	.0019

V13
by V46

Mean Rank	Cases		
231.50	1	V46 =	0
245.18	19	V46 =	1
254.16	169	V46 =	2
252.07	148	V46 =	3
268.09	178	V46 =	4
	515	Total	

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
515	1.3382	.8549	4.8132	.3070

- - - - - Kruskal-Wallis 1-way ANOVA

V14
by V46

Mean Rank	Cases		
146.50	1	V46 =	0
190.25	14	V46 =	1
250.47	143	V46 =	2
206.14	143	V46 =	3
251.96	169	V46 =	4
	470	Total	

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
470	12.8846	.0119	16.9836	.0019

- - - - - Kruskal-Wallis 1-way ANOVA

V15
by V46

Mean Rank	Cases		
116.50	1	V46 =	0
196.69	13	V46 =	1
236.00	134	V46 =	2
218.21	124	V46 =	3
210.92	167	V46 =	4
	439	Total	

CASES	Chi-Square	Significance	Corrected for Ties Chi-Square	Corrected for Ties Significance
439	4.1165	.3905	4.8455	.3035

V13
by V47

Mean Rank	Cases		
222.50	7	V47 =	1
240.92	13	V47 =	2
244.59	65	V47 =	3
249.14	132	V47 =	4
250.99	280	V47 =	5

	497	Total	

			Corrected for Ties	
CASES	Chi-Square	Significance	Chi-Square	Significance
497	.3947	.9829	1.3755	.8484

- - - - - Kruskal-Wallis 1-way ANOVA

V14
by V47

Mean Rank	Cases		
164.86	7	V47 =	1
185.62	13	V47 =	2
194.11	57	V47 =	3
219.91	128	V47 =	4
246.37	253	V47 =	5

	458	Total	

			Corrected for Ties	
CASES	Chi-Square	Significance	Chi-Square	Significance
458	11.9539	.0177	15.6279	.0036

- - - - - Kruskal-Wallis 1-way ANOVA

V15
by V47

Mean Rank	Cases		
133.42	6	V47 =	1
151.82	11	V47 =	2
176.81	54	V47 =	3
204.41	117	V47 =	4
231.98	239	V47 =	5

	427	Total	

			Corrected for Ties	
CASES	Chi-Square	Significance	Chi-Square	Significance
[illegible]	[illegible]	[illegible]	18.8491	.0008

TABLE C-1: RANK CORRELATION ANALYSIS - KENDALL's TAU C, N, (P)

Question No.	13	14	15	13/8	14/8	15/8
Meaning	Contacts to AECB	Consultative Documents	Press Releases	Contacts per Year	Consultative Documents per Year	Press Releases per Year
44 Age	0.03450 517 (0.0202)	0.07780 474 (0.0027)	0.10279 443 (0.0005)	0.04058 357 (0.0310)	0.02124 320 (0.2685)	0.04018 301 (0.1409)
13 Contacts to AECB	0.20808 533 (0.0000)	0.13354 483 (0.0000)	0.06326 454 (0.0000)	0.26598 366 (0.0000)	0.14929 324 (0.0000)	0.05602 306 (0.0076)
14 Consultative Documents	0.13354 483 (0.0000)	0.61617 487 (0.0000)	0.19761 432 (0.0000)	0.15822 324 (0.0000)	0.60861 327 (0.0000)	0.19996 286 (0.0000)
15 Press Releases	0.06326 454 (0.0000)	0.19761 432 (0.0000)	0.72782 457 (0.0000)	0.06773 306 (0.0013)	0.18799 286 (0.0000)	0.69161 309 (0.0000)

Crosstabulation: V1
By V36

V1	V36-> 1.00	2.00	Row Total
1.00	239	207	446
	53.6	46.4	93.5
	96.8	90.0	
	50.1	43.4	
2.00	8	23	31
	25.8	74.2	6.5
	3.2	10.0	
	1.7	4.8	
Column Total	247	230	477
	51.8	48.2	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
7.88143	1	.0050	14.948	None
8.95954	1	.0028	(Before Yates Correction)	

Crosstabulation: V2
By V36

V2	V36-> 1.00	2.00	Row Total
1.00	221	185	406
	54.4	45.6	82.5
	88.4	76.4	
	44.9	37.6	
2.00	29	57	86
	33.7	66.3	17.5
	11.6	23.6	
	5.9	11.6	
Column Total	250	242	492
	50.8	49.2	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
11.36691	1	.0007	42.301	None
12.18154	1	.0005	(Before Yates Correction)	

Crosstabulation: V9
By V36

V9	V36-> 1.00	2.00	Row Total
1.00	81	108	189
	42.9	57.1	38.5
	32.4	44.8	
	16.5	22.0	
2.00	103	76	179
	57.5	42.5	36.5
	41.2	31.5	
	21.0	15.5	
3.00	38	39	77
	49.4	50.6	15.7
	15.2	16.2	
	7.7	7.9	
4.00	25	11	36
	69.4	30.6	7.3
	10.0	4.6	
	5.1	2.2	
5.00	3	7	10
	30.0	70.0	2.0
	1.2	2.9	
	.6	1.4	
Column Total	250	241	491
	50.9	49.1	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
14.82721	4	.0051	4.908	1 OF 10 (10.0%)

Crosstabulation: V13
By V36

V13	V36-> 1.00	2.00	Row Total
0.0	233	204	437
	Row Pct 53.3	46.7	88.8
	Col Pct 93.2	84.3	
	Tot Pct 47.4	41.5	
1.00	17	38	55
	Row Pct 30.9	69.1	11.2
	Col Pct 6.8	15.7	
	Tot Pct 3.5	7.7	
Column Total	250 50.8	242 49.2	492 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
8.93906	1	.0028	27.053	None
9.81518	1	.0017	(Before Yates Correction)	

Crosstabulation: V14
By V36

V14	V36-> 1.00	2.00	Row Total
0.0	155	124	279
	Row Pct 55.6	44.4	56.7
	Col Pct 62.0	51.2	
	Tot Pct 31.5	25.2	
1.00	95	118	213
	Row Pct 44.6	55.4	43.3
	Col Pct 38.0	48.8	
	Tot Pct 19.3	24.0	
Column Total	250 50.8	242 49.2	492 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
5.36945	1	.0205	104.768	None
5.79946	1	.0160	(Before Yates Correction)	

Crosstabulation: V15
By V36

V15 \ V36->	1.00	2.00	Row Total
0.0	100	122	222
	45.0	55.0	45.1
	40.0	50.4	
	20.3	24.8	
1.00	150	120	270
	55.6	44.4	54.9
	60.0	49.6	
	30.5	24.4	
Column Total	250	242	492
	50.8	49.2	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
4.97253	1	.0258	109.195	None
5.38485	1	.0203	(Before Yates Correction)	

Crosstabulation: V18
By V36

V18 \ V36->	1.00	2.00	Row Total
1.00	140	96	236
	59.3	40.7	57.6
	67.6	47.3	
	34.1	23.4	
2.00	67	107	174
	38.5	61.5	42.4
	32.4	52.7	
	16.3	26.1	
Column Total	207	203	410
	50.5	49.5	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
16.53867	1	.0000	86.151	None
17.36142	1	.0000	(Before Yates Correction)	

Crosstabulation: V16
By V36

V16	V36->	1.00	2.00	Row Total
1.00	Count	89	75	164
	Row Pct	54.3	45.7	34.2
	Col Pct	36.8	31.5	
	Tot Pct	18.5	15.6	
2.00	Count	68	62	130
	Row Pct	52.3	47.7	27.1
	Col Pct	28.1	26.1	
	Tot Pct	14.2	12.9	
3.00	Count	67	76	143
	Row Pct	46.9	53.1	29.8
	Col Pct	27.7	31.9	
	Tot Pct	14.0	15.8	
4.00	Count	12	14	26
	Row Pct	46.2	53.8	5.4
	Col Pct	5.0	5.9	
	Tot Pct	2.5	2.9	
5.00	Count	6	11	17
	Row Pct	35.3	64.7	3.5
	Col Pct	2.5	4.6	
	Tot Pct	1.3	2.3	
Column Total		242	238	480
		50.4	49.6	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
3.62983	4	.4584	8.429	None

Crosstabulation: V19
By V36

V19	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	Row Total
1.00	Count	10	9	19
	Row Pct	52.6	47.4	4.6
	Col Pct	4.6	4.6	
	Tot Pct	2.4	2.2	
2.00	Count	13	21	34
	Row Pct	38.2	61.8	8.3
	Col Pct	6.0	10.8	
	Tot Pct	3.2	5.1	
3.00	Count	46	49	95
	Row Pct	48.4	51.6	23.1
	Col Pct	21.2	25.3	
	Tot Pct	11.2	11.9	
4.00	Count	63	55	118
	Row Pct	53.4	46.6	28.7
	Col Pct	29.0	28.4	
	Tot Pct	15.3	13.4	
5.00	Count	85	60	145
	Row Pct	58.6	41.4	35.3
	Col Pct	39.2	30.9	
	Tot Pct	20.7	14.6	
Column Total		217 52.8	194 47.2	411 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
5.61291	4	.2300	8.968	None

Crosstabulation: V2
By V7

V2	V7-> 1.00	2.00	Row Total
1.00	315	92	407
	77.4	22.6	83.7
	89.5	68.7	
	64.8	18.9	
2.00	37	42	79
	46.8	53.2	16.3
	10.5	31.3	
	7.6	8.6	
Column Total	352	134	486
	72.4	27.6	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
29.42865	1	.0000	21.782	None
30.94004	1	.0000	(Before Yates Correction)	

Crosstabulation: V13
By V7

V13	V7-> 1.00	2.00	Row Total
0.0	298	125	423
	70.4	29.6	87.0
	84.7	93.3	
	61.3	25.7	
1.00	54	9	63
	85.7	14.3	13.0
	15.3	6.7	
	11.1	1.9	
Column Total	352	134	486
	72.4	27.6	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
5.65680	1	.0174	17.370	None
6.39838	1	.0114	(Before Yates Correction)	

Crosstabulation: V9
By V7

V9	V7-> 1.00	2.00	Row Total
1.00	139	47	186
	74.7	25.3	38.5
	39.6	35.6	
	28.8	9.7	
2.00	133	46	179
	74.3	25.7	37.1
	37.9	34.8	
	27.5	9.5	
3.00	51	28	79
	64.6	35.4	16.4
	14.5	21.2	
	10.6	5.8	
4.00	25	10	35
	71.4	28.6	7.2
	7.1	7.6	
	5.2	2.1	
5.00	3	1	4
	75.0	25.0	.8
	.9	.8	
	.6	.2	
Column Total	351	132	483
	72.7	27.3	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
3.29416	4	.5099	1.093	2 OF 10 (20.0%)

Crosstabulation: V14
By V7

V14	V7-> 1.00	2.00	Row Total
0.0	179	81	260
	68.8	31.2	53.5
	50.9	60.4	
	36.8	16.7	
1.00	173	53	226
	76.5	23.5	46.5
	49.1	39.6	
	35.6	10.9	
Column Total	352	134	486
	72.4	27.6	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
3.21665	1	.0729	62.313	None
3.59200	1	.0581	(Before Yates Correction)	

Crosstabulation: V15
By V7

V15	V7-> 1.00	2.00	Row Total
0.0	130	72	202
	64.4	35.6	41.6
	36.9	53.7	
	26.7	14.8	
1.00	222	62	284
	78.2	21.8	58.4
	63.1	46.3	
	45.7	12.8	
Column Total	352	134	486
	72.4	27.6	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
10.59631	1	.0011	55.695	None
11.27737	1	.0008	(Before Yates Correction)	

Crosstabulation: V16
By V7

V16	V7-> 1.00	2.00	Row Total
1.00	128	34	162
	79.0	21.0	34.5
	37.4	26.8	
	27.3	7.2	
2.00	85	41	126
	67.5	32.5	26.9
	24.9	32.3	
	18.1	8.7	
3.00	94	42	136
	69.1	30.9	29.0
	27.5	33.1	
	20.0	9.0	
4.00	21	7	28
	75.0	25.0	6.0
	6.1	5.5	
	4.5	1.5	
5.00	14	3	17
	82.4	17.6	3.6
	4.1	2.4	
	3.0	.6	
Column Total	342	127	469
	72.9	27.1	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
6.77031	4	.1485	4.603	1 OF 10 (10.0%)

Crosstabulation: V18
By V7

V18	V7-> 1.00	2.00	Row Total
1.00	187	48	235
	79.6	20.4	58.0
	62.3	45.7	
	46.2	11.9	
2.00	113	57	170
	66.5	33.5	42.0
	37.7	54.3	
	27.9	14.1	
Column Total	300	105	405
	74.1	25.9	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
8.15071	1	.0043	44.074	None
8.81985	1	.0030	(Before Yates Correction)	

Crosstabulation: V19
By V7

V19	V7-> 1.00	2.00	Row Total
1.00	14	5	19
	73.7	26.3	4.5
	4.5	4.8	
	3.3	1.2	
2.00	25	17	42
	59.5	40.5	10.0
	8.0	16.3	
	6.0	4.1	
3.00	71	26	97
	73.2	26.8	23.2
	22.6	25.0	
	17.0	6.2	
4.00	90	27	117
	76.9	23.1	28.0
	28.7	26.0	
	21.5	6.5	
5.00	114	29	143
	79.7	20.3	34.2
	36.3	27.9	
	27.3	6.9	
Column Total	314	104	418
	75.1	24.9	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
7.50188	4	.1116	4.727	1 OF 10 (10.0%)

Crosstabulation: V1
By V40

V1 \ V40->	1.00	2.00	Row Total
1.00	106	260	366
	29.0	71.0	92.7
	93.0	92.5	
	26.8	65.8	
2.00	8	21	29
	27.6	72.4	7.3
	7.0	7.5	
	2.0	5.3	
Column Total	114	281	395
	28.9	71.1	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
.00000	1	1.0000	8.370	None
.02476	1	.8750	(Before Yates Correction)	

Crosstabulation: V2
By V40

V2 \ V40->	1.00	2.00	Row Total
1.00	101	239	340
	29.7	70.3	83.3
	87.8	81.6	
	24.8	58.6	
2.00	14	54	68
	20.6	79.4	16.7
	12.2	18.4	
	3.4	13.2	
Column Total	115	293	408
	28.2	71.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
1.89863	1	.1682	19.167	None
2.32728	1	.1271	(Before Yates Correction)	

Crosstabulation: V9
By V40

V9	V40-> 1.00	2.00	Row Total
1.00	67	101	168
	39.9	60.1	41.2
	58.3	34.5	
	16.4	24.8	
2.00	32	119	151
	21.2	78.8	37.0
	27.8	40.6	
	7.8	29.2	
3.00	11	46	57
	19.3	80.7	14.0
	9.6	15.7	
	2.7	11.3	
4.00	5	22	27
	18.5	81.5	6.6
	4.3	7.5	
	1.2	5.4	
5.00		5	5
		100.0	1.2
		1.7	
		1.2	
Column Total	115	293	408
	28.2	71.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
20.43420	4	.0004	1.409	2 OF 10 (20.0%)

Crosstabulation: V13
By V40

V13	V40-> 1.00	2.00	Row Total
0.0	93	268	361
	Row Pct 25.8	74.2	88.5
	Col Pct 80.9	91.5	
	Tot Pct 22.8	65.7	
1.00	22	25	47
	Row Pct 46.8	53.2	11.5
	Col Pct 19.1	8.5	
	Tot Pct 5.4	6.1	
Column Total	115 28.2	293 71.8	408 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
8.09051	1	.0044	13.248	None
9.10059	1	.0026	(Before Yates Correction)	

Crosstabulation: V14
By V40

V14	V40-> 1.00	2.00	Row Total
0.0	51	184	235
	Row Pct 21.7	78.3	57.6
	Col Pct 44.3	62.8	
	Tot Pct 12.5	45.1	
1.00	64	109	173
	Row Pct 37.0	63.0	42.4
	Col Pct 55.7	37.2	
	Tot Pct 15.7	26.7	
Column Total	115 28.2	293 71.8	408 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
10.76870	1	.0010	48.762	None
11.51178	1	.0007	(Before Yates Correction)	

Crosstabulation: V16
By V40

V16	V40-> 1.00	2.00	Row Total
1.00	29	100	129
	Row Pct 22.5	77.5	32.4
	Col Pct 25.7	35.1	
	Tot Pct 7.3	25.1	
2.00	31	78	109
	Row Pct 28.4	71.6	27.4
	Col Pct 27.4	27.4	
	Tot Pct 7.8	19.6	
3.00	37	86	123
	Row Pct 30.1	69.9	30.9
	Col Pct 32.7	30.2	
	Tot Pct 9.3	21.6	
4.00	10	11	21
	Row Pct 47.6	52.4	5.3
	Col Pct 8.8	3.9	
	Tot Pct 2.5	2.8	
5.00	6	10	16
	Row Pct 37.5	62.5	4.0
	Col Pct 5.3	3.5	
	Tot Pct 1.5	2.5	
Column Total	113 28.4	285 71.6	398 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
6.86130	4	.1434	4.543	1 OF 10 (10.0%)

Crosstabulation: V15
By V40

V15	V40-> 1.00	2.00	Row Total
0.0	52	133	185
	28.1	71.9	45.3
	45.2	45.4	
	12.7	32.6	
1.00	63	160	223
	28.3	71.7	54.7
	54.8	54.6	
	15.4	39.2	
Column Total	115	293	408
	28.2	71.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
.00000	1	1.0000	52.145	None
.00102	1	.9745	(Before Yates Correction)	

Crosstabulation: V18
By V40

V18	V40-> 1.00	2.00	Row Total
1.00	34	147	181
	18.8	81.2	53.9
	35.4	61.3	
	10.1	43.8	
2.00	62	93	155
	40.0	60.0	46.1
	64.6	38.8	
	18.5	27.7	
Column Total	96	240	336
	28.6	71.4	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
17.39014	1	.0000	44.286	None
18.41503	1	.0000	(Before Yates Correction)	

Crosstabulation: V19
By V40

V19	V40-> 1.00	2.00	Row Total
1.00	Count 4	7	11
	Row Pct 36.4	63.6	3.2
	Col Pct 4.3	2.8	
	Tot Pct 1.2	2.1	
2.00	Count 11	17	28
	Row Pct 39.3	60.7	8.2
	Col Pct 11.7	6.9	
	Tot Pct 3.2	5.0	
3.00	Count 20	57	77
	Row Pct 26.0	74.0	22.6
	Col Pct 21.3	23.2	
	Tot Pct 5.9	16.8	
4.00	Count 26	72	98
	Row Pct 26.5	73.5	28.8
	Col Pct 27.7	29.3	
	Tot Pct 7.6	21.2	
5.00	Count 33	93	126
	Row Pct 26.2	73.8	37.1
	Col Pct 35.1	37.8	
	Tot Pct 9.7	27.4	
Column Total	94 27.6	246 72.4	340 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
2.61635	4	.6239	3.041	1 OF 10 (10.0%)

Crosstabulation: V1
By V44

V1	V44-> 1.00	2.00	Row Total
1.00	378	98	476
	79.4	20.6	93.5
	92.4	98.0	
	74.3	19.3	
2.00	31	2	33
	93.9	6.1	6.5
	7.6	2.0	
	6.1	.4	
Column Total	409	100	509
	80.4	19.6	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
3.25683	1	.0711	6.483	None
4.12577	1	.0422	(Before Yates Correction)	

Crosstabulation: V2
By V44

V2	V44-> 1.00	2.00	Row Total
1.00	337	89	426
	79.1	20.9	80.8
	79.5	86.4	
	63.9	16.9	
2.00	87	14	101
	86.1	13.9	19.2
	20.5	13.6	
	16.5	2.7	
Column Total	424	103	527
	80.5	19.5	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
2.13878	1	.1436	19.740	None
2.56642	1	.1092	(Before Yates Correction)	

Crosstabulation: V9
By V44

V9	V44->	1.00	2.00	Row Total
1.00	Count	143	57	200
	Row Pct	71.5	28.5	38.1
	Col Pct	33.9	55.3	
	Tot Pct	27.2	10.9	
2.00	Count	161	26	187
	Row Pct	86.1	13.9	35.6
	Col Pct	38.2	25.2	
	Tot Pct	30.7	5.0	
3.00	Count	76	14	90
	Row Pct	84.4	15.6	17.1
	Col Pct	18.0	13.6	
	Tot Pct	14.5	2.7	
4.00	Count	34	5	39
	Row Pct	87.2	12.8	7.4
	Col Pct	8.1	4.9	
	Tot Pct	6.5	1.0	
5.00	Count	8	1	9
	Row Pct	88.9	11.1	1.7
	Col Pct	1.9	1.0	
	Tot Pct	1.5	.2	
Column Total		422	103	525
		80.4	19.6	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
16.37459	4	.0026	1.766	1 OF 10 (10.0%)

Crosstabulation: V13
By V44

V13	V44-> 1.00	2.00	Row Total
0.0	381	83	464
	82.1	17.9	88.0
	89.9	80.6	
	72.3	15.7	
1.00	43	20	63
	68.3	31.7	12.0
	10.1	19.4	
	8.2	3.8	
Column Total	424	103	527
	80.5	19.5	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
5.92181	1	.0150	12.313	None
6.77444	1	.0092	(Before Yates Correction)	

Crosstabulation: V14
By V44

V14	V44-> 1.00	2.00	Row Total
0.0	259	37	296
	87.5	12.5	56.2
	61.1	35.9	
	49.1	7.0	
1.00	165	66	231
	71.4	28.6	43.8
	38.9	64.1	
	31.3	12.5	
Column Total	424	103	527
	80.5	19.5	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
20.30201	1	.0000	45.148	None
21.31180	1	.0000	(Before Yates Correction)	

Crosstabulation: V15
By V44

V15	V44-> 1.00	2.00	Row Total
0.0	200	35	235
	85.1	14.9	44.6
	47.2	34.0	
	38.0	6.6	
1.00	224	68	292
	76.7	23.3	55.4
	52.8	66.0	
	42.5	12.9	
Column Total	424	103	527
	80.5	19.5	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
5.31287	1	.0212	45.930	None
5.83448	1	.0157	(Before Yates Correction)	

Crosstabulation: V18
By V44

V18	V44-> 1.00	2.00	Row Total
1.00	207	51	258
	80.2	19.8	58.9
	59.7	56.0	
	47.3	11.6	
2.00	140	40	180
	77.8	22.2	41.1
	40.3	44.0	
	32.0	9.1	
Column Total	347	91	438
	79.2	20.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
.25336	1	.6147	37.397	None

Crosstabulation: V16
By V44

V16	V44-> 1.00	2.00	Row Total
1.00	153	28	181
	84.5	15.5	35.4
	36.9	29.2	
	29.9	5.5	
2.00	113	25	138
	81.9	18.1	27.0
	27.2	26.0	
	22.1	4.9	
3.00	117	30	147
	79.6	20.4	28.8
	28.2	31.3	
	22.9	5.9	
4.00	20	8	28
	71.4	28.6	5.5
	4.8	8.3	
	3.9	1.6	
5.00	12	5	17
	70.6	29.4	3.3
	2.9	5.2	
	2.3	1.0	
Column Total	415	96	511
	81.2	18.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
4.61421	4	.3292	3.194	1 OF 10 (10.0%)

Crosstabulation: V19
By V44

V19	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	Row Total
1.00		10	11	21
		47.6	52.4	4.8
		2.8	12.2	
		2.3	2.5	
2.00		21	23	44
		47.7	52.3	10.0
		6.0	25.6	
		4.8	5.2	
3.00		85	14	99
		85.9	14.1	22.4
		24.1	15.6	
		19.2	3.2	
4.00		101	20	121
		83.5	16.5	27.4
		28.7	22.2	
		22.9	4.5	
5.00		135	22	157
		86.0	14.0	35.5
		38.4	24.4	
		30.5	5.0	
Column Total		352	90	442
		79.6	20.4	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
48.26888	4	.0000	4.276	1 OF 10 (10.0%)

Crosstabulation: V1
By V45

V1	V45-> 1.00	2.00	Row Total
1.00	427	47	474
	90.1	9.9	93.5
	95.1	81.0	
	84.2	9.3	
2.00	22	11	33
	66.7	33.3	6.5
	4.9	19.0	
	4.3	2.2	
Column Total	449	58	507
	88.6	11.4	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
14.46847	1	.0001	3.775	1 of 4 (25.0%)
16.69995	1	.0000	(Before Yates Correction)	

Crosstabulation: V2
By V45

V2	V45-> 1.00	2.00	Row Total
1.00	386	40	426
	90.6	9.4	81.1
	83.5	63.5	
	73.5	7.6	
2.00	76	23	99
	76.8	23.2	18.9
	16.5	36.5	
	14.5	4.4	
Column Total	462	63	525
	88.0	12.0	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
13.29535	1	.0003	11.880	None
14.57673	1	.0001	(Before Yates Correction)	

Crosstabulation: V9
By V45

V9	V45-> 1.00	2.00	Row Total
1.00	176	23	199
	Row Pct 88.4	11.6	38.0
	Col Pct 38.3	36.5	
	Tot Pct 33.7	4.4	
2.00	163	23	186
	Row Pct 87.6	12.4	35.6
	Col Pct 35.4	36.5	
	Tot Pct 31.2	4.4	
3.00	77	13	90
	Row Pct 85.6	14.4	17.2
	Col Pct 16.7	20.6	
	Tot Pct 14.7	2.5	
4.00	38	1	39
	Row Pct 97.4	2.6	7.5
	Col Pct 8.3	1.6	
	Tot Pct 7.3	.2	
5.00	6	3	9
	Row Pct 66.7	33.3	1.7
	Col Pct 1.3	4.8	
	Tot Pct 1.1	.6	
Column Total	460	63	523
	88.0	12.0	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
7.71022	4	.1028	1.084	2 OF 10 (20.0%)

Crosstabulation: V13
By V45

V13	V45-> 1.00	2.00	Row Total
0.0	Count 405	58	463
	Row Pct 87.5	12.5	88.2
	Col Pct 87.7	92.1	
	Tot Pct 77.1	11.0	
1.00	Count 57	5	62
	Row Pct 91.9	8.1	11.8
	Col Pct 12.3	7.9	
	Tot Pct 10.9	1.0	
Column Total	462 88.0	63 12.0	525 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
.65182	1	.4195	7.440	None
1.03110	1	.3099	(Before Yates Correction)	

Crosstabulation: V14
By V45

V14	V45-> 1.00	2.00	Row Total
0.0	Count 253	42	295
	Row Pct 85.8	14.2	56.2
	Col Pct 54.8	66.7	
	Tot Pct 48.2	8.0	
1.00	Count 209	21	230
	Row Pct 90.9	9.1	43.8
	Col Pct 45.2	33.3	
	Tot Pct 39.8	4.0	
Column Total	462 88.0	63 12.0	525 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
2.72650	1	.0987	27.600	None
3.19178	1	.0740	(Before Yates Correction)	

Crosstabulation: V15
By V45

V15	V45-> 1.00	2.00	Row Total
0.0	195	40	235
	83.0	17.0	44.8
	42.2	63.5	
	37.1	7.6	
1.00	267	23	290
	92.1	7.9	55.2
	57.8	36.5	
	50.9	4.4	
Column Total	462	63	525
	88.0	12.0	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
9.31508	1	.0023	28.200	None
10.15766	1	.0014	(Before Yates Correction)	

Crosstabulation: V18
By V45

V18	V45-> 1.00	2.00	Row Total
1.00	231	25	256
	90.2	9.8	58.7
	59.5	52.1	
	53.0	5.7	
2.00	157	23	180
	87.2	12.8	41.3
	40.5	47.9	
	36.0	5.3	
Column Total	388	48	436
	89.0	11.0	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
.69546	1	.4043	19.817	None
.97877	1	.3225	(Before Yates Correction)	

Crosstabulation: V16
By V45

V16	V45-> 1.00	2.00	Row Total
1.00	157	24	181
	86.7	13.3	35.5
	35.0	39.3	
	30.8	4.7	
2.00	120	18	138
	87.0	13.0	27.1
	26.7	29.5	
	23.5	3.5	
3.00	131	15	146
	89.7	10.3	28.6
	29.2	24.6	
	25.7	2.9	
4.00	24	4	28
	85.7	14.3	5.5
	5.3	6.6	
	4.7	.8	
5.00	17		17
	100.0		3.3
	3.8		
	3.3		
Column Total	449	61	510
	88.0	12.0	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
3.29142	4	.5103	2.033	2 OF 10 (20.0%)

Crosstabulation: V19
By V45

V19	V45-> 1.00	2.00	Row Total
1.00	19	2	21
	90.5	9.5	4.8
	4.8	4.2	
	4.3	.5	
2.00	40	4	44
	90.9	9.1	10.0
	10.2	8.3	
	9.1	.9	
3.00	87	12	99
	87.9	12.1	22.4
	22.1	25.0	
	19.7	2.7	
4.00	108	12	120
	90.0	10.0	27.2
	27.5	25.0	
	24.5	2.7	
5.00	139	18	157
	88.5	11.5	35.6
	35.4	37.5	
	31.5	4.1	
Column Total	393	48	441
	89.1	10.9	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
.49344	4	.9741	2.286	2 OF 10 (20.0%)

Crosstabulation: V19
By V46

V19	V46->	0.0	1.00	2.00	3.00	4.00	Row Total
1.00	Count		4	3	5	9	21
	Row Pct		19.0	14.3	23.8	42.9	4.8
	Col Pct		26.7	2.0	3.8	6.3	
	Tot Pct		.9	.7	1.1	2.0	
2.00	Count		4	20	12	8	44
	Row Pct		9.1	45.5	27.3	18.2	10.0
	Col Pct		26.7	13.2	9.2	5.6	
	Tot Pct		.9	4.5	2.7	1.8	
3.00	Count		3	39	25	33	100
	Row Pct		3.0	39.0	25.0	33.0	22.6
	Col Pct		20.0	25.7	19.1	23.1	
	Tot Pct		.7	8.8	5.7	7.5	
4.00	Count	1	2	40	35	43	121
	Row Pct	.8	1.7	33.1	28.9	35.5	27.4
	Col Pct	100.0	13.3	26.3	26.7	30.1	
	Tot Pct	.2	.5	9.0	7.9	9.7	
5.00	Count		2	50	54	50	156
	Row Pct		1.3	32.1	34.6	32.1	35.3
	Col Pct		13.3	32.9	41.2	35.0	
	Tot Pct		.5	11.3	12.2	11.3	
Column Total		1 .2	15 3.4	152 34.4	131 29.6	143 32.4	442 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
36.38177	16	.0026	.048	9 OF 25 (36.0%)

Crosstabulation: V16
By V46

V16	V46-> 0.0	1.00	2.00	3.00	4.00	Row Total
1.00	Count	6	57	70	47	180
	Row Pct	3.3	31.7	38.9	26.1	35.3
	Col Pct	31.6	35.0	47.9	26.0	
	Tot Pct	1.2	11.2	13.7	9.2	
2.00	Count	6	48	39	44	137
	Row Pct	4.4	35.0	28.5	32.1	26.9
	Col Pct	31.6	29.4	26.7	24.3	
	Tot Pct	1.2	9.4	7.6	8.6	
3.00	Count	1	7	44	28	68	148
	Row Pct	.7	4.7	29.7	18.9	45.9	29.0
	Col Pct	100.0	36.8	27.0	19.2	37.6	
	Tot Pct	.2	1.4	8.6	5.5	13.3	
4.00	Count		8	5	15	28
	Row Pct		28.6	17.9	53.6	5.5
	Col Pct		4.9	3.4	8.3	
	Tot Pct		1.6	1.0	2.9	
5.00	Count		6	4	7	17
	Row Pct		35.3	23.5	41.2	3.3
	Col Pct		3.7	2.7	3.9	
	Tot Pct		1.2	.8	1.4	
Column Total		1 .2	19 3.7	163 32.0	146 28.6	181 35.5	510 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
30.53303	16	.0154	.033	8 OF 25 (32.0%)

Crosstabulation: V15
By V46

V15	Count / Row Pct / Col Pct / Tot Pct	0.0	1.00	2.00	3.00	4.00	Row Total
0.0		1	7	60	67	97	232
		.4	3.0	25.9	28.9	41.8	44.2
		100.0	33.3	35.5	44.7	52.7	
		.2	1.3	11.4	12.8	18.5	
1.00			14	109	83	87	293
			4.8	37.2	28.3	29.7	55.8
			66.7	64.5	55.3	47.3	
			2.7	20.8	15.8	16.6	
Column Total		1 .2	21 4.0	169 32.2	150 28.6	184 35.0	525 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
12.87680	4	.0119	.442	2 OF 10 (20.0%)

Crosstabulation: V18
By V46

V18	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	Row Total
1.00		13	92	86	65	256
		5.1	35.9	33.6	25.4	58.7
		76.5	63.4	71.1	42.5	
		3.0	21.1	19.7	14.9	
2.00		4	53	35	88	180
		2.2	29.4	19.4	48.9	41.3
		23.5	36.6	28.9	57.5	
		.9	12.2	8.0	20.2	
Column Total		17 3.9	145 33.3	121 27.8	153 35.1	436 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
27.80488	3	.0000	7.018	None

Crosstabulation: V9
By V46

V9	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	5.00	Row Total
1.00		5	51	44	98	1	199
		2.5	25.6	22.1	49.2	.5	38.0
		23.8	30.5	29.3	53.3	100.0	
		1.0	9.8	8.4	18.7	.2	
2.00		4	65	63	54		186
		2.2	34.9	33.9	29.0		35.6
		19.0	38.9	42.0	29.3		
		.8	12.4	12.0	10.3		
3.00		9	35	21	24		89
		10.1	39.3	23.6	27.0		17.0
		42.9	21.0	14.0	13.0		
		1.7	6.7	4.0	4.6		
4.00		2	12	19	6		39
		5.1	30.8	48.7	15.4		7.5
		9.5	7.2	12.7	3.3		
		.4	2.3	3.6	1.1		
5.00		1	4	3	2		10
		10.0	40.0	30.0	20.0		1.9
		4.8	2.4	2.0	1.1		
		.2	.8	.6	.4		
Column Total		21	167	150	184	1	523
		4.0	31.9	28.7	35.2	.2	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
49.26553	16	.0000	.019	11 OF 25 (44.0%)

Crosstabulation: V13
By V46

V13 \ V46->	0.0	1.00	2.00	3.00	4.00	Row Total
0.0	1	18	154	136	153	462
	.2	3.9	33.3	29.4	33.1	88.0
	100.0	85.7	91.1	90.7	83.2	
	.2	3.4	29.3	25.9	29.1	
1.00		3	15	14	31	63
		4.8	23.8	22.2	49.2	12.0
		14.3	8.9	9.3	16.8	
		.6	2.9	2.7	5.9	
Column Total	1 .2	21 4.0	169 32.2	150 28.6	184 35.0	525 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
6.90744	4	.1409	.120	3 OF 10 (30.0%)

Crosstabulation: V14
By V46

V14 \ V46->	0.0	1.00	2.00	3.00	4.00	Row Total
0.0	1	11	79	105	96	292
	.3	3.8	27.1	36.0	32.9	55.6
	100.0	52.4	46.7	70.0	52.2	
	.2	2.1	15.0	20.0	18.3	
1.00		10	90	45	88	233
		4.3	38.6	19.3	37.8	44.4
		47.6	53.3	30.0	47.8	
		1.9	17.1	8.6	16.8	
Column Total	1 .2	21 4.0	169 32.2	150 28.6	184 35.0	525 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
19.73013	4	.0006	.444	2 OF 10 (20.0%)

Crosstabulation: V1
By V46

V1	V46->	0.0	1.00	2.00	3.00	4.00	Row Total
1.00	Count	1	15	161	137	161	475
	Row Pct	.2	3.2	33.9	28.8	33.9	93.5
	Col Pct	100.0	78.9	96.4	94.5	91.5	
	Tot Pct	.2	3.0	31.7	27.0	31.7	
2.00	Count		4	6	8	15	33
	Row Pct		12.1	18.2	24.2	45.5	6.5
	Col Pct		21.1	3.6	5.5	8.5	
	Tot Pct		.8	1.2	1.6	3.0	
Column Total		1 .2	19 3.7	167 32.9	145 28.5	176 34.6	508 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
10.43388	4	.0337	.065	3 OF 10 (30.0%)

Crosstabulation: V2
By V46

V2	V46->	0.0	1.00	2.00	3.00	4.00	Row Total
1.00	Count	1	8	140	122	154	425
	Row Pct	.2	1.9	32.9	28.7	36.2	81.0
	Col Pct	100.0	38.1	82.8	81.3	83.7	
	Tot Pct	.2	1.5	26.7	23.2	29.3	
2.00	Count		13	29	28	30	100
	Row Pct		13.0	29.0	28.0	30.0	19.0
	Col Pct		61.9	17.2	18.7	16.3	
	Tot Pct		2.5	5.5	5.3	5.7	
Column Total		1 .2	21 4.0	169 32.2	150 28.6	184 35.0	525 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
25.55276	4	.0000	1.008	0 OF 10 (.0%)

Crosstabulation: V1
By V46

V1	V46-> 1.00	2.00	3.00	4.00	5.00	Row Total
1.00	Count 15	161	137	161	1	475
	Row Pct 3.2	33.9	28.8	33.9	.2	93.5
	Col Pct 78.9	96.4	94.5	91.5	100.0	
	Tot Pct 3.0	31.7	27.0	31.7	.2	
2.00	Count 4	6	8	15		33
	Row Pct 12.1	18.2	24.2	45.5		6.5
	Col Pct 21.1	3.6	5.5	8.5		
	Tot Pct .8	1.2	1.6	3.0		
Column Total	19 / 3.7	167 / 32.9	145 / 28.5	176 / 34.6	1 / .2	508 / 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
10.43388	4	.0337	.065	3 OF 10 (30.0%)

Crosstabulation: V2
By V46

V2	V46-> 1.00	2.00	3.00	4.00	5.00	Row Total
1.00	Count 8	140	122	154	1	425
	Row Pct 1.9	32.9	28.7	36.2	.2	81.0
	Col Pct 38.1	82.8	81.3	83.7	100.0	
	Tot Pct 1.5	26.7	23.2	29.3	.2	
2.00	Count 13	29	28	30		100
	Row Pct 13.0	29.0	28.0	30.0		19.0
	Col Pct 61.9	17.2	18.7	16.3		
	Tot Pct 2.5	5.5	5.3	5.7		
Column Total	21 / 4.0	169 / 32.2	150 / 28.6	184 / 35.0	1 / .2	525 / 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
26.55276	4	.0000	.190	3 OF 10 (30.0%)

Crosstabulation: V1
By V47

V1	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	5.00	Row Total
1.00		4	9	51	122	273	459
		.9	2.0	11.1	26.6	59.5	93.3
		57.1	75.0	83.6	92.4	97.5	
		.8	1.8	10.4	24.8	55.5	
2.00		3	3	10	10	7	33
		9.1	9.1	30.3	30.3	21.2	6.7
		42.9	25.0	16.4	7.6	2.5	
		.6	.6	2.0	2.0	1.4	
Column Total		7	12	61	132	280	492
		1.4	2.4	12.4	26.8	56.9	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
38.26199	4	.0000	.470	3 OF 10 (30.0%)

Crosstabulation: V2
By V47

V2	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	5.00	Row Total
1.00		2	5	38	107	258	410
		.5	1.2	9.3	26.1	62.9	80.9
		28.6	38.5	58.5	77.0	91.2	
		.4	1.0	7.5	21.1	50.9	
2.00		5	8	27	32	25	97
		5.2	8.2	27.8	33.0	25.8	19.1
		71.4	61.5	41.5	23.0	8.8	
		1.0	1.6	5.3	6.3	4.9	
Column Total		7	13	65	139	283	507
		1.4	2.6	12.8	27.4	55.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
69.33337	4	.0000	1.339	2 OF 10 (20.0%)

Crosstabulation: V9
By V47

V9	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	5.00	Row Total
1.00		2	5	15	44	126	192
		1.0	2.6	7.8	22.9	65.6	37.9
		28.6	38.5	23.1	31.9	44.5	
		.4	1.0	3.0	8.7	24.9	
2.00		2	3	31	50	96	182
		1.1	1.6	17.0	27.5	52.7	36.0
		28.6	23.1	47.7	36.2	33.9	
		.4	.6	6.1	9.9	19.0	
3.00		3	3	8	30	41	85
		3.5	3.5	9.4	35.3	48.2	16.8
		42.9	23.1	12.3	21.7	14.5	
		.6	.6	1.6	5.9	8.1	
4.00			1	9	11	16	37
			2.7	24.3	29.7	43.2	7.3
			7.7	13.8	8.0	5.7	
			.2	1.8	2.2	3.2	
5.00			1	2	3	4	10
			10.0	20.0	30.0	40.0	2.0
			7.7	3.1	2.2	1.4	
			.2	.4	.6	.8	
Column Total		7 1.4	13 2.6	65 12.8	138 27.3	283 55.9	506 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
27.47890	16	.0365	.138	13 OF 25 (52.0%)

Crosstabulation: V13
By V47

V13	V47-> 1.00	2.00	3.00	4.00	5.00	Row Total
0.0	7	12	59	118	248	444
	1.6	2.7	13.3	26.6	55.9	87.6
	100.0	92.3	90.8	84.9	87.6	
	1.4	2.4	11.6	23.3	48.9	
1.00		1	6	21	35	63
		1.6	9.5	33.3	55.6	12.4
		7.7	9.2	15.1	12.4	
		.2	1.2	4.1	6.9	
Column Total	7	13	65	139	283	507
	1.4	2.6	12.8	27.4	55.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
2.79040	4	.5935	.870	2 OF 10 (20.0%)

Crosstabulation: V14
By V47

V14	V47-> 1.00	2.00	3.00	4.00	5.00	Row Total
0.0	6	10	41	83	142	282
	2.1	3.5	14.5	29.4	50.4	55.6
	85.7	76.9	63.1	59.7	50.2	
	1.2	2.0	8.1	16.4	28.0	
1.00	1	3	24	56	141	225
	.4	1.3	10.7	24.9	62.7	44.4
	14.3	23.1	36.9	40.3	49.8	
	.2	.6	4.7	11.0	27.8	
Column Total	7	13	65	139	283	507
	1.4	2.6	12.8	27.4	55.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
10.76270	4	.0294	3.107	2 OF 10 (20.0%)

Crosstabulation: V15
By V47

V15	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	5.00	Row Total
0.0		5	9	35	68	108	225
		2.2	4.0	15.6	30.2	48.0	44.4
		71.4	69.2	53.8	48.9	38.2	
		1.0	1.8	6.9	13.4	21.3	
1.00		2	4	30	71	175	282
		.7	1.4	10.6	25.2	62.1	55.6
		28.6	30.8	46.2	51.1	61.8	
		.4	.8	5.9	14.0	34.5	
Column Total		7	13	65	139	283	507
		1.4	2.6	12.8	27.4	55.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
13.27991	4	.0100	3.107	2 OF 10 (20.0%)

Crosstabulation: V18
By V47

V18	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	5.00	Row Total
1.00		2	5	27	75	139	248
		.8	2.0	10.9	30.2	56.0	58.5
		33.3	45.5	52.9	65.2	57.7	
		.5	1.2	6.4	17.7	32.8	
2.00		4	6	24	40	102	176
		2.3	3.4	13.6	22.7	58.0	41.5
		66.7	54.5	47.1	34.8	42.3	
		.9	1.4	5.7	9.4	24.1	
Column Total		6	11	51	115	241	424
		1.4	2.6	12.0	27.1	56.8	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
5.18996	4	.2684	2.491	3 OF 10 (30.0%)

Crosstabulation: V16
By V47

V16	Count / Row Pct / Col Pct / Tot Pct	1.00	2.00	3.00	4.00	5.00	Row Total
1.00		1	4	22	53	89	169
		.6	2.4	13.0	31.4	52.7	34.3
		14.3	33.3	35.5	39.0	32.4	
		.2	.8	4.5	10.8	18.1	
2.00		2	3	17	42	73	137
		1.5	2.2	12.4	30.7	53.3	27.8
		28.6	25.0	27.4	30.9	26.5	
		.4	.6	3.5	8.5	14.8	
3.00		4	2	21	37	77	141
		2.8	1.4	14.9	26.2	54.6	28.7
		57.1	16.7	33.9	27.2	28.0	
		.8	.4	4.3	7.5	15.7	
4.00			3	2	4	19	28
			10.7	7.1	14.3	67.9	5.7
			25.0	3.2	2.9	6.9	
			.6	.4	.8	3.9	
5.00						17	17
						100.0	3.5
						6.2	
						3.5	
Column Total		7	12	62	136	275	492
		1.4	2.4	12.6	27.6	55.9	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
30.83995	16	.0141	.242	13 OF 25 (52.0%)

Crosstabulation: V19
By V47

V19	V47-> 1.00	2.00	3.00	4.00	5.00	Row Total
1.00			2	6	13	21
			9.5	28.6	61.9	4.9
			4.3	5.0	5.3	
			.5	1.4	3.1	
2.00	1		4	10	26	41
	2.4		9.8	24.4	63.4	9.6
	20.0		8.5	8.4	10.7	
	.2		.9	2.4	6.1	
3.00		5	12	29	50	96
		5.2	12.5	30.2	52.1	22.6
		50.0	25.5	24.4	20.5	
		1.2	2.8	6.8	11.8	
4.00	2	1	7	38	68	116
	1.7	.9	6.0	32.8	58.6	27.3
	40.0	10.0	14.9	31.9	27.9	
	.5	.2	1.6	8.9	16.0	
5.00	2	4	22	36	87	151
	1.3	2.6	14.6	23.8	57.6	35.5
	40.0	40.0	46.8	30.3	35.7	
	.5	.9	5.2	8.5	20.5	
Column Total	5	10	47	119	244	425
	1.2	2.4	11.1	28.0	57.4	100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
15.87999	16	.4614	.247	12 OF 25 (48.0%)